DOCUMENT RESUME

ED 200 399 SE 033 774

AUTHOR Taylor, Mary Louise, Ed.
TITLE Curriculum: U.S. Capacities, Developing Countries' Needs. A Study of How Well U.S. Colleges and Universities are Meeting the Needs of Students from Developing Countries in Selected Fields of Science, Technology, Administration and Social Sciences.
INSTITUTION Institute of International Education, New York, N.Y.
SPONS AGENCY DeWitt Wallace / Reader's Digest Fund, Pleasantville, N.Y.
PUB DATE 79
NOTE 252p.; Report of a Session at the Conference on International Education (Washington, DC, February 26-28, 1979).
AVAILABLE FROM Institute of International Education, 809 United Nations Plaza, New York, NY 10017 ($14.00).

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS Agricultural Education; Business Administration; College Science; Curriculum Evaluation; *Developing Nations; *Educational Needs; Engineering Technology; *Foreign Students; Higher Education; *International Education; *Science Education; Surveys; Technology

ABSTRACT

This investigation was undertaken to discover how effectively U.S. postsecondary curricula in key development fields are meeting the needs of students who will return to careers in countries much less developed industrially than the United States and which have very different agricultural and health-care needs. Research focused on U.S. curricula in agriculture, business administration, economics, engineering, engineering-related technologies, science, and health care professions. Department chairmen of U.S. universities with large numbers of foreign students were surveyed, as were diplomatic representatives of less-developed countries, U.S. cultural and public affairs officers in the countries, and developing-country alumni. Findings of the evaluation panel were that, in general, U.S. curricula are based on a core of essential knowledge that cannot, without serious loss, be modified significantly for a group of students with special needs. It was recommended that summer seminars, allowing U.S. faculty to teach in foreign countries, and students doing their dissertation research at home would be helpful. (Author/SK)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

Curriculum: U.S. Capacities, Developing Countries' Needs

A Report from the 1979 Conference on International Education

INTERNATIONAL EDUCATION: THE GLOBAL CONTEXT, THE U.S. ROLE

ED200399

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

"PERMISSION TO REPRODUCE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

Gail A. Cohen of the Inst. of Inten Ed.

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

SE 033 774

CURRICULUM: U. S. CAPACITIES, DEVELOPING COUNTRIES' NEEDS

A study of how, and how well, U.S. colleges and universities are meeting the needs of students from developing countries in selected fields of science, technology, administration and social sciences.

Report of a Session at the
1979 Conference on International Education
INTERNATIONAL EDUCATION: THE GLOBAL CONTEXT, THE U. S. ROLE
A Cooperative Examination of Critical Issues
February 26-28, 1979, Washington, D.C.

Richard B. Myer, Session Chairman
Mary Louise Taylor, Editor

Published by Institute of International Education
809 United Nations Plaza
New York, New York 10017

We are grateful to the Reader's Digest Foundation for a grant which has helped make possible the publication of this report.

Copyright © 1979 Institute of International Education.
Printed in the United States of America.

TABLE OF CONTENTS

List of Conference Cosponsors vi

Abstract. vii

Acknowledgements viii

Study Group Members ix

PREFACE by Wallace B. Edgerton xi

INTRODUCTION 1

CHAPTER I THE BACKGROUND 3

Introductory Remarks by Richard B. Myer, Chairman 3

Summary of Pre-Conference Planning and Research by Richard B. Myer 7

CHAPTER II: THE VIEW FROM ABROAD 19

Curriculum: U.S. Capacities, Developing Countries' Needs by Dr. Davidson Nicol 19

Survey of U.S. Posts in Developing Countries 29

Survey of Developing-Country Embassies in the United States 49

Survey of LDC Alumni of Four U.S. Universities 58

CHAPTER III: THE VIEW FROM THE UNITED STATES 87

Curriculum: U.S. Capacities, Developing Countries' Needs by Harold Enarson 87

CONFERENCE PANEL 1: Theory and Practice of Development: Summary 94

Development Theories and Practices and Their Implications for U.S. Colleges and Universities by Donald C. Stone 96

Training for Development by Harold Lubell 99

CONFERENCE PANEL 2: Engineering: Summary 101

Introductory Remarks by Merton R. Barry 105

American Education System for Foreign Students by Dale A. Carlson 108

A "Troika" U.S. Response for Providing Engineering Education and Training for International Students by Franklin J. Ahimaz 112

CONFERENCE PANEL 3: Business Administration: Summary 119

Business Administration Curriculum: U.S. Curriculum Developing Countries' Needs by Stefan H. Robock 123

CONFERENCE PANEL 4: Health Care Professions: Summary 127

Allied Health Education and Its Relevance for The Developing Countries by Beulah M. Ashbrook 129

Graduate Nursing Education and the Developing Countries by Virginia M. Ohlson 132

CONFERENCE PANEL 5: Agriculture: Summary 136

The Community College - An International Institution by Ron Heisner 139

Curriculum: U.S. Capacities, Developing Countries' Needs in Agriculture by Janet Poley 145

Agricultural Economics and Developing Country Needs by Harold Riley 150

Some Observations on University-Level Training for Agricultural Science in Developing Countries by T. Wickham 152

U.S. Curricular Modifications for Agriculturalists from Developing Countries by L. W. Zuidema 154

CONFERENCE PANEL 6: Engineering Technologies: Summary 159

Engineering Technology and Students from Developing Countries by K. Nagaraja Rao 161

A Proposal to Refocus U.S. Efforts in Engineering and Engineering Technology for Development by K. Nagaraja Rao and Lawrence L. Barrell 164

Engineering Technologies for Developing Countries by Richard J. Ungrodt 169

Trade and Technical Schools: An Educational Shortcut by Daniel Finn 173

CONFERENCE PANEL 7: Science: Summary 175

The Science Education Improvement Project in India - A Personal Account by Gordon L. Hiebert 178

Chemical Education Orientation Guide for Foreign Students by Robert C. Brasted 185

CHAPTER IV: CONCLUSIONS AND RECOMMENDATIONS 189
The Pre-Conference Surveys 189
The Plenary Sessions 197
The Seven Panel Discussions 199
Dissent 203

APPENDIX A: Countries Included in the Surveys 207
APPENDIX B: Pre-Conference Surveys of U.S. Institutions 210
Allied Health Professions 211
Biology 214
Business Administration 217
Chemistry 219
Community and Junior Colleges 221
Economics 224
Engineering and Engineering Technology 227
Nursing and Related Health-Care Fields 231
Physics 235
Survey of National Association of State Universities and Land-Grant Colleges (NASULGC) 237

The 1979 Conference on International Education: A Cooperative Examination of Critical Issues

Cosponsors:

Academy for Educational Development
African American Institute
AFS International/Intercultural Programs, Inc.
Agricultural Development Council
AIESEC/U.S.
America Mideast Educational and Training Services
American Association of Collegiate Registrars and Admissions Officers
American Association of Community and Junior Colleges
American Association of State Colleges and Universities
American Council on Education
  Council for International Exchange of Scholars
  Division of International Educational Relations
  Overseas Liaison Committee
American Scandinavian Foundation
American Universities Field Staff
Asia Foundation
Association of American Colleges
Association of American Universities
Board of Foreign Scholarships
Charles F. Kettering Foundation
College Entrance Examination Board
Council of Graduate Schools in the U.S.
Council of Chief State School Officers
Council on International Educational Exchange
Council of International Programs for Youth Leaders and Social Workers
Council on International and Public Affairs
Council on Religion and International Affairs
East-West Center
English-Speaking Union of the U.S.
Experiment in International Living
Ford Foundation
Foreign Policy Association
Fulbright Alumni Association
Global Development Studies Institute
Global Perspectives in Education, Inc.
IAESTE/U.S.
Institute of International Education
International Communication Agency
International Council for Educational Development
International House
International Management and Development Institute
International Research and Exchanges Board
International Schools Services
International Studies Association
Japan Society
National Association for Foreign Student Affairs
National Association of State Universities and Land-Grant Colleges
National Association of Trade and Technical Schools
National Committee on U.S./China Relations
National Council for Community Services to International Visitors
National Council of Community World Affairs Organizations
National Council on Philanthropy
National Research Council
Operation Crossroads Africa, Inc.
Overseas Development Council
Partners of the Americas
President's Commission on Foreign Language and International Studies
Sister Cities International
Society for Citizen Education in World Affairs
Society for Intercultural Education, Training and Research
United Nations Association of the U.S.A.
U.S. Agency for International Development
U.S. National Commission for UNESCO
U.S. Office of Education
World Without War Council
Youth for Understanding

Steering Committee

Chairperson: Joan H. Joshi, Vice President, Educational Services, Institute of International Education

Jennifer Froistad, Vice President, Programs and International Operations AFS International/Intercultural Programs, Inc.

Regina M.J. Kyle, Director, Program Development, Association of American Colleges

Becky Owens, Acting Director, International Educational Relations, American Council on Education

Andrew F. Smith, Director, Program Development, Global Perpsectives in Education, Inc.

F. Champion Ward, Senior Consultant in International Education, Ford Foundation

Jayne M. Wood, Director, Public Education, Overseas Development Council

Conference Manager: Micaela Thorup, Institute of International Education

CURRICULUM: U. S. CAPACITIES, DEVELOPING COUNTRIES' NEEDS

ABSTRACT

This investigation was undertaken as an effort to discover how effectively U.S. postsecondary curricula in key development fields are meeting the needs of students who will return to careers in countries which are much less developed industrially than the United States and which have very different agricultural and health-care needs. In 1976-77, 131,300 students from 66 less-developed countries studied were enrolled in U.S. colleges and universities.

Research focused on U.S. curricula in agriculture, business administration, economics, engineering, engineering-related technologies, science, and the health care professions. Department chairmen of U.S. universities with large numbers of foreign students were surveyed, as were diplomatic representatives of the 66 countries, U.S. cultural and public affairs officers in the countries, and the developing-country alumni, graduated since 1950, of four major U.S. universities.

The findings of these surveys were analyzed by leaders in each of the key fields. They conducted panel discussions at the 1979 Conference on International Education, attended by educators, U.S. and foreign government personnel, and development experts in various fields.

In general, the panels felt that U.S. curricula are based on a core of essential knowledge that cannot, without serious loss, be modified significantly for a group of students with special needs. However, they recommended a variety of approaches to helping the LDC student adapt what he/she learns in the United States to home-country conditions and needs. These included special centers for LDC students, summer seminars, linkages between U.S. and LDC institutions allowing U.S. faculty to teach in the countries, and arrangements for LDC students to do thesis and dissertation research at home.

ACKNOWLEDGEMENTS

Literally hundreds of people contributed to this project. We wish to thank particularly the many college and university people, developing-country embassy staff members and ministries of education, U.S. International Communication Agency and other U.S. officers abroad, and the developing-country alumni of U.S. universities who took the time and thought to give insightful, articulate answers to our many survey questions. We also wish to thank the office of Ambassador Jean Wilkowski, U.S. Coordinator for the UN Conference on Science and Technology for Development, Department of State, for a grant in support of the pre-Conference survey research.

Special thanks must go to Sandra L. Cervera, administrative secretary, who not only handled the many complicated arrangements involved in assembling the panels and providing their members with pre-Conference study materials, but who also prepared all the pre-Conference survey forms and mailed them out, typed numerous drafts of the IIE papers prepared for the session, and then typed virtually all of this book in its final form.

Richard B. Myer
Mary Louise Taylor

STUDY GROUP MEMBERS

This group planned the research leading to the Conference panel presentations.

Richard B. Myer, Vice President, Planning and Program Development, Institute of International Education, Chairman

Blanche Anderson, Program Associate-International, American Association of State Colleges and Universities (AASCU)

J. W. Cowan, Director, International Programs, National Association of State Universities and Land-Grant Colleges (NASULGC)

Richard F. Crabbs, Executive Associate, Council for International Exchange of Scholars (CIES)

Margaret Fahs, Administrative Assistant, International Programs, National Association of State Universities and Land-Grant Colleges (NASULGC)

Frank D. Hansing, Acting Director of Fellowships, National Research Council, National Academy of Sciences

Pete Howell, Advisory Councillor, AIESEC-U.S. (International Association for Management and Economics Students-U.S.)

Stirling L. Huntley, Director of Admissions and Associate Dean of Graduate Studies, California Institute of Technology, representing AACRAO (American Association of Collegiate Registrars and Admissions Officers)

Robert M. Sprinkle, Executive Director, IAESTE-U.S. (International Association for the Exchange of Students for Technical Experience-U.S.)

Suzanne Swan, Congress Committee President, AIESEC-U.S.

Phillip A. Taylor, National Association of Trade and Technical Schools (NATTS)

Marian Tipton, Program Coordinator, Academic Relations Office, International Communication Agency (ICA)

Mary Louise Taylor, Program Planner, Institute of International Education, Rapporteur

PREFACE

The transfer of technology from the developed to the developing world is a major issue of our time. IIE believes that the most effective, longest-lasting technology transfer is accomplished through international education. Men and women trained in the theory, development and application of scientific processes in industrial nations can apply that knowledge on behalf of their home countries throughout forty or more years of productive life.

For this reason, it is important that the issue of curricular relevance receive closer attention than it has in the past. Is U.S. education now meeting developing country needs? How can it do the job more effectively? What are the constraints on U.S. higher education's capacity to meet the LDCs' specific needs?

IIE and 66 cosponsoring agencies brought together several hundred educators, government officials and others from all over the world in a national conference on international education in Washington, D.C., on February 26-28. "Curriculum: U.S. Capacities, Developing Countries' Needs" was a major topic. The conference presentations were backed up by extensive research surveys.

The present study draws on both conference discussions and the research effort. It represents a beginning in what we hope will become a much more extensive examination of the topic in the United States and around the world. The United States has roughly one-third of the world's higher education capacity as measured in terms of enrollment. U.S. education's policy and practice in regard to the LDC student will affect the pace of development in much of the world. We need to know much more about the effectiveness of the education we offer.

Wallace B. Edgerton
President, Institute of International Education
June, 1979

Curriculum: U.S. Capacities, Developing Countries' Needs

INTRODUCTION

Scientific and technical knowledge has become one of the United States' principal exports to the developing world. In 1977-78, there were approximately 180,000 students from the less-developed regions enrolled in U.S. colleges and universities, out of more than 235,000 foreign students altogether. Seventy-nine per cent of all these students were in scientific, managerial, or technology-related fields: engineering, business and management, natural and life sciences, mathematics and computer sciences, health professions, and agriculture.

Recognizing the significance that this sojourn of LDC students in the United States has for the future development of their countries, the planners of the 1979 Conference on International Education selected as a major Conference theme the question of how well U.S. postsecondary curricula are preparing LDC students for careers at home.

The documents contained in this report describe both the pre-Conference investigations commissioned by the Conference Planning Group and the sessions of the Conference devoted to curriculum relevance.

The pre-Conference work consisted primarily of a series of surveys sent to U.S. educators, experts and observers in various overseas locations, and LDC alumni. The Conference session on curricula featured two very thoughtful speeches and a series of panels on the disciplines most closely associated with economic development.

Chapter I, "The Background" contains Conference Chairman Richard B. Myer's opening summary as well as his summary report on the pre-Conference surveys. Chapter II, "The View from Abroad," contains the speech that Dr. Davidson Nicol, Executive Director of UNITAR (United Nations Institute for Training and Research) and former rector of the University of Sierra Leone, gave at the plenary session. It also contains excerpts from observations by U.S. Cultural Affairs Officers and other attaches in developing countries on how U.S. higher education is meeting development needs, and some excerpts from various developing country government officials on the same subject. The chapter concludes with Chairman Richard B. Myer's report on his survey of foreign alumni of four major U.S. universities.

Chapter III contains the plenary session address given by Dr. Harold I. Enarson, President of Ohio State University, a summary of the surveys of U.S. college and university departments in key development fields, and the reports of the individual conference panels. The latter include excerpts from papers prepared for the panels; the record is not complete, however, since not all panelists submitted papers.

Chapter IV summarizes the major conclusions and recommendations. The Appendix contains details of the surveys.

CHAPTER I: THE BACKGROUND

Introductory Remarks by Richard B. Myer, Chairman

We will be examining and debating vigorously, I trust, an issue high on the agenda of all who are concerned about the education of students from the developing countries of the world in U.S. post-secondary institutions. That issue is, simply: How well do we prepare those students for successful and useful careers at home?

I am inclined to think that the issue has at least two primary aspects. One has to do with the application of the students' educational experience in the U.S. to their subsequent careers. Were those experiences relevant in content? Did they enable the former students to advance, financially and otherwise, at least as rapidly as their peers who were educated elsewhere? The other relates to the question of whether the U.S. experience enables or encourages the individual LDC alumnus to contribute more productively to the general economic development of his or her country.

These are important questions, and devilishly difficult to measure even under the most favorable circumstances - especially the one which asks about the contributions to economic development.

What further complicates the issue is the degree of obligation and the capacity of U.S. institutions to do more for LDC students than they are doing now -- assuming, of course, that it can be shown that offering them something other than the current curriculum will make a measurable difference to their careers and/or to their contributions to national development.

An organizing team began last summer to arrange a series of surveys that would provide data which we hoped would illuminate -- if not settle -- some of the questions most germane to our topic. Those of you who have read the two reports prepared for this session have a full appreciation of the steps taken and some under-

---

Richard B. Myer, a leading U.S. authority and consultant on international educational exchange, is a former Vice President of the Institute of International Education.

standing of the results obtained. I will not go over the details again. I do want to parade for your consideration, however, several preliminary conclusions that seem to follow from the data we collected:

First, we cannot safely generalize about the relevance of U.S. curriculum for LDC students. There seem to be fairly significant differences in this regard, among individuals -- as you might expect -- and among groups. There is some evidence, for example, that alumni from the Far East -- mainly the Republics of Korea and Taiwan -- and South Asia have had more success with their U.S. education than have those from Southeast Asia. Similarly, alumni in the sciences, the medical professions, and agriculture report more complete use of their education than do those in business, economics, or engineering.

This finding is especially curious, for it conflicts in part with the statement made by a number of alumni that if they were to start their studies all over again, they would incorporate a strong minor in business or shift their major to that field.

Second, These differences by field and region notwithstanding, most foreign alumni have reported in most studies on the subject that they are working in fields related to their major field of U.S. study and are making use of much of what they learned here.

Third, while the over-all situation, therefore, seems to be favorable, the fact that business and engineering students are making relatively less use of their experience should give us concern, for they constitute 46 per cent of the total foreign student population in U.S. higher education.

Fourth, there are strongly divergent views among educators about their obligations to foreign students as a group. Some faculty and administrators state quite unequivocally that they are mandated to serve the local community and will welcome foreign students only if they are prepared to make the best of what is available. Others want to respond to what they assume are the special needs of this group by creating alternative curricula and the like. More than personal attitudes and biases are at work here, however. These varying points of view are doubtlessly influenced by local resources, the size of foreign student contingents on campus, and the pressures

from state legislatures.

Fifth, those institutions that would like to give extra help to their foreign students are frequently at a loss to know what form of help would be most beneficial. They how little about the conditions under which LDC alumni will work when they return home and what alternatives to the regular curriculum, therefore, would best respond to those conditions.

Sixth, frustrating many of those who would bend the system to accommodate special foreign student needs is the lack of financial resources or the rapidly declining levels of such resources available for this purpose from within their institutions and from outside sources.

Seventh, most of what we can say about this problem rests on a very modest factual base. Little research has been done on it. Even some of the most affluent sponsors of LDC students have not bothered to check on the use former fellows are making of their overseas education.

That leads me to the reasons that we are meeting and what we hope to achieve at this session. We are addressing at least three audiences who are only partially represented here. We are certainly going to say something of interest to the community of foreign students, especially those from the developing countries. Our exchange will necessarily bear on the concerns of U.S. educators and those institutions which sponsor LDC students in the U.S., that is, their governments, the U.S. government, and other funding agencies. Lastly, I hope that our deliberations will be heard or read by those organizing the United Nations Conference on Science and Technology for Development, and the new U.S. Foundation for Technological Cooperation. Both of these will have to deal with the question of educating developing country students abroad. They will need guidance on this score and we will see that they soon learn what was said and proposed here today.

Now, in regard to the United Nations Conference, we have received a letter from Ambassador Jean Wilkowski who is U.S. Coordinator for the Conference. She writes "the role that non-governmental organizations can play is critical to what the Conference can achieve. For example, colleges and universities could agree to undertake a commitment to

join with specific institutions in the developing world to adjust science and technology curricula to actual needs of developing countries." Such a dialogue could be a real earnest of a practical result of the UN Conference. It is hoped that this could be discussed fully at the IIE Conference, and working groups set up to consider this and any other proposals that might seem appropriate as part of the U.S. position at the UN Conference in Vienna in August.

IIE's reply to the Ambassador is that, indeed, we will, and have, encouraged the panel chairman for this session to make her call to action a part of this agenda. IIE is also prepared to create the working groups or whatever other means may be required to implement the recommendations forthcoming from the panel sessions, particularly those responsive to the Ambassador's special plea.

SUMMARY OF PRE-CONFERENCE PLANNING AND RESEARCH

By Richard B. Myer, Chairman

(The following paper - included here in abridged form - was distributed to all Conference participants before the meeting.)

The Conference session occurring on Wednesday morning, February 28, will deal with the issue of how well higher education in the United States prepares students from the less developed countries for useful careers in their home communities.

More specifically, this session's presentations and discussions focus on at least four questions germane to the issue of curriculum for LDC students:

1. What constitutes a relevant academic experience for developing country students?

2. To what extent is higher education providing such an experience to these students?

   -As judged by U.S. educators

   -As judged by LDC students

   -As judged by fellowship sponsors, employers and other interested parties

3. What do U.S. educators believe that their institutions should be offering LDC students to maximize educational relevance? How do the students answer this question?

4. Under what circumstances - financial and otherwise - could U.S. institutions increase the relevance of their instruction.

Complicating these difficult questions are the diverse influences of time, home country and field of study, to identify but a few of the more obvious factors that determine long-term benefits of education.

The impact of time is clearly to be seen in the experience of students who came to the United States some years ago from what are now rapidly industrializing countries-- countries such as Brazil, India, Mexico, Venezuela, Taiwan, and South Korea. What was too advanced and sophisticated for those students 15 years ago may be eminently useful today.

The influence of home country is also important. That is, academic subject matter that may be immediately applicable in Malaysia may have little or no utility at this time in Bangladesh or Lesotho. A decade or so hence, this disparity may narrow appreciably or even disappear.

A more obvious source of variation, perhaps, is that of subject matter or field of study. Brazilians may find 85% of the electrical engineering curriculum in U.S. engineering schools right on target, for example, and more than half of an agronomy program not at all useful. A reverse relationship might occur in the case of students from, let us say, Pakistan and Jamaica.

Hoping to better our understanding of both the empiric and normative elements of the relevance issue, Conference planners have structured the curriculum session and arranged several preparatory surveys to insure that as much current information, and as many points of view, as can be obtained on the subject will be presented. The two main speakers will undoubtedly concentrate on the more general question of what LDC students should expect from their U.S. education. Dr. Davidson Nicol, Executive Director of UNITAR, will speak for the students and those who sponsor or finance them. Dr. Harold I. Enarson, President of Ohio State University, will respond from the perspective of U.S. higher education and its capacities and sense of obligation to the foreign student.

The seven concurrent panels, meeting in the latter half of the session, are based on the fields of study that are the most popular with LDC students and seem to be most directly related to economic development. Panelists, all of whom have considerable knowledge of foreign student curricula, will assess the relevance of existing curricula and make recommendations for changes.

WHY RELEVANCE?

The casual observer of foreign student affairs - and even some who are rather well informed - may say that the topic of relevance has been around a long time and been exhaustively pondered. Can there be, he may ask, anything really fresh to talk about? The Conference organizers believe that, in fact, we know very little about: (1) the extent to which LDC students are able to employ their education at home for personal advancement and/or economic development, (2) what special programs for these students are available at U.S. institutions to raise the level of relevance, and (3) what attitudes toward the issue are dominant among U.S. educators and the students themselves.

A reasonably thorough examination of the literature has revealed a poverty of studies, if those conducted by U.S.A.I.D. of its own participant trainees are excluded. A basic reference for a search of this literature is The World's Students in the U.S., a 1976 Praeger publication by Seth Spaulding and Michael Flack. It richly annotates over 500 titles on international education that have appeared since 1965. Of this literature, only 24 titles treat foreign students or trainees following their return home, and of these 24 only five are addressed to some segment of the great bulk of foreign students who are privately sponsored or assisted by U.S. universities, foundations, international agencies, or their home governments. Moreover, these five are limited either to returnees in three fields -- engineering, library science, and education -- or to two countries, Thailand and Turkey. In effect, the only substantial

research on curriculum relevance identified by Spaulding and Flack which incorporates a broad array of independent variables was conducted by AID on its highly specialized participant trainees.

The ERIC system was also employed in the search for literature. Among its 300,000 or so items were only four that reported research of any consequence on curriculum relevance.

Perhaps the single most significant piece of work uncovered was brought to our attention, paradoxically, by a Colombian correspondent. It was a dissertation by Ralph Harbison, presently of the Ford Foundation, on Colombians who had studied abroad. It is a thoughtful, if exceedingly intricate, study which emphasizes the financial returns from overseas education.

In summary, it seems reasonable to conclude, as did Spaulding and Flack, that there has been a "paucity of research on foreign students' perceptions of (the) quality of relevance of academic programs" in their host countries and little research on what kinds of programs would best prepare foreign students to fill positions awaiting them at home.

The few studies that report interviews with returnees are largely the work of AID and are now highly outdated. Though useful, they leave unexamined the great mass of foreign students who attend our universities through other channels. This group has scarcely been touched as yet and what research has been done has not attempted to test the impact of study abroad beyond the individual. What the effects may be on selected institutions and societies as a whole, we can only surmise.

As a final word on the literature, we might observe that the entire corpus of work on relevance has shifted perceptibly over the past decade, away from concern for cross-cultural understanding toward much more utilitarian outcomes such as impact on employment and economic growth. This is a product, in all likelihood, of the shifting priorities in the larger field of international relations.

Preparation for the Session

The basic decisions which determined the form and content of the curriculum session were made by a planning group representing several of the Conference co-sponsors. Its members are listed in the front of this book.

This group decided that only LDC students would be considered, given the fact that the great bulk of foreign students in the U.S. is from countries in that bloc - that is, some 80 per cent. It also decided to limit the dimension of interest to LDC students in the United States, rather than include other industrialized countries, and to concentrate on these students. We regretted the resulting omission of the humanities, the arts, education, and certain other fields, but concluded it would be

impracticable to extend further the included fields. Currently, only 10 per cent of all foreign students are in the humanities and the arts, a figure which has been declining steadily for several years and which probably, in any event, includes relatively few LDC students.

The session planners then fixed a schedule of surveys to gather data on the central topic for use by Conference panelists and participants. To assess the U.S. viewpoint on curriculum relevance, surveys were dispatched to institutional members of NASULGC (National Association of State Universities and Land-Grant Colleges) AASCU (American Association of State Colleges and Universities), AACJC (American Association of Community and Junior Colleges), and NATTS (National Association of Trade and Technical Schools). They were also sent to heads of selected academic units in colleges and universities with large numbers of foreign students, generally over 500. The units included those responsible for:

Graduate Nursing	Chemistry
Public Health	Biology
Allied Health Disciplines	Physics
Economics	Business Administration
Engineering	

The questionnaire asked respondents to describe any special programs for foreign students that they offered, to evaluate the relevance of regular curricular offerings for foreign students, and to communicate their views on whether their units should be doing more to raise the relevance of the curriculum.

To obtain judgments on the relevance issue from persons in the developing countries, a basic letter containing three questions was sent to a variety of information sources overseas and in Washington. They included Fulbright Commissions in the developing countries, Cultural Affairs Officers in most of the LDC-based U.S. embassies, Ford Foundation representatives abroad and Educational Attaches posted to Washington from LDCs with more than one hundred fifty students in the U.S. The letter asked: What fields are most important to the country in question? What do public and private employers see as the strengths and weaknesses of U.S.-trained employees? How could U.S. higher education serve the country's needs more effectively?

Thanks to encouragement from the Office of the U.S. Coordinator for the UN Conference on Science and Technology for Development, Department of State, the planning group undertook a pilot survey of LDC alumni of four U.S. universities, Massachusetts Institute of Technology, North-

eastern University, Ohio State University and the University of Illinois.[1] The results of this survey are set forth in detail in Chapter II.

A third perspective on the issue of U.S. curriculum relevance was sought from a number of national and international agencies which have sponsored foreign students in the U.S. and from individual experts in the field of international education. AID evaluation literature was examined, and AID personnel responsible for evaluation activities were interviewed. The evaluation efforts of the United Nations Development Program (UNDP), UNESCO, the Ford and Rockefeller Foundations, the World Bank, Organization of American States, and the Inter-American Development Bank were also explored, as were those of the National Association of Foreign Student Affairs (NAFSA) and a small sampling of individual foreign student advisors.

Survey Responses and Preliminary Findings

It is not the purpose of this paper to record the full volume of findings from the pre-Conference surveys. It would be appropriate, however, and we may hope interesting, for Conference participants to preview the data secured and to share with the planning group some of its preliminary findings.

A. U.S. Educational Institutions

From among the 136 members of *NASULGC*, 78 responded to the survey, reporting a fairly substantial scattering of special programs or activities for foreign students. The results do not show, however, a truly widespread recognition of, or reaction to, the unusual needs of this group. Only 13 of the 72, answering a question on future curriculum planning, reported that relevance for LDC students would be a "major policy consideration." On the other hand, 49 said that it would be an important factor in respect to certain disciplines. An equally ambiguous reply was given to the question of whether foreign students are assigned "research problems considered relevant to their home country." While only seven said they were "as a policy," 58 said they were "insofar as possible." It is certain, however, that relatively few graduate students from abroad conduct their thesis research at home. Fifty schools reported that 0-5 per cent of their M.A. candidates do so, and 34 gave this minimum figure for their Ph.D. candidates. Despite the bunching of respondents at the lowest measure, six schools reported that over 50 per cent of their doctoral students do carry out research at home. It would be interesting to know why these schools have such an exceptionally high experience in this regard.

---

[1] The Office of the U.S. Coordinator for the UN Conference on Science and Technology for Development, Department of State, provided a matching grant to the Conference to help defray the cost of the pre-Conference surveys described in this paper.

A part of the NASULGC survey asked representatives of five major disciplines to report special offerings for, or attention given to, foreign students in six different categories of activity. The agriculturalists and teacher educators are clearly doing more for them than the departments or schools of business, health science, and engineering. The evidence suggests, however, that many of the special programs in teacher education are designed to give foreign students basic subject matter which is lacking in their preparatory education.

Special seminars or courses organized only for foreign students, for example, were reported by 12 of the 44 agricultural college respondents and 16 of 65 teacher education departments. Only two of 55 business schools and three of 51 engineering schools were able to report affirmatively on this category. Seventeen of the ag colleges and 21 of the teacher education schools reported organizing special field trips for foreign students. Two of the business schools and two of the engineering schools also reported doing so.

In respect to practical training encouragement or requirements for foreign students, special course requirements, and even the incorporation into faculty lectures of "materials deemed relevant to foreign students," the agricultural and teacher education schools do substantially more than do those in business, engineering and health. Counter to the argument, however, that the differences in this instance may stem from the nature of the subject matter is the fact that 18 of the business school respondents and 13 from both the health and engineering faculties reported incorporating special materials for foreign students into regular courses. This suggests, at least, that the relevance in all five of these major study areas would be strengthened by giving extra attention to the peculiar needs of foreign students.

The *AASCU* surveys were far less substantive than those from NASULGC members and, therefore, will not be examined here in any detail. AASCU schools generally have smaller foreign student populations and thus have somewhat less incentive for creating special programs or services. Most of the foreign student activities supported by AASCU respondents are English language and orientation programs.

Completed questionnaires were received from 128 of the 404 *community and junior colleges* surveyed. Of the 27 special LDC student programs reported by 24 institutions, only two related to major course work. The remaining 25 were primarily English language and orientation programs to ready students for regular courses. The two exceptions were especially designed to meet defined needs of the large number of Nigerian Government sponsored technology students who have arrived here over the past 14 months. Many of the institutions responding negatively to this question observed in explanation that they were chartered to meet local community needs and/or had too few foreign students to warrant extra effort.

An equally large number maintained, however, that some of their regular programs are responsive to foreign student needs. They pointed to allied health subjects (51), business and management (54) and engineer-

ing technology (33). Curiously, 23 of the junior colleges expressed the belief that their agricultural sciences courses were probably not relevant for LDC students.

In answering the question which asked what they think their college should be doing to modify curricula and prepare faculty to meet special academic needs of LDC students, several respondents called for help in identifying the economic problems and objectives of the developing countries. Some of them would also welcome assistance in easing the adjustment of foreign students and in tutoring faculty about them.

What comes through clearly in these junior college responses is that: (1) there are still relatively few such colleges which have had extensive experience with foreign students, (2) an even smaller number feel confident about handling large numbers of them, and (3) perhaps fewer than a dozen have made any attempt to devise relevant academic programs. The importance to the developing countries of engineering technology, allied health subjects and agricultural technologies, in particular, and the increasing attraction U.S. programs in these fields have for foreign students strongly argue in favor of directing more national attention and resources to those junior colleges which are ready to accommodate larger numbers of LDC students.[2]

Two hundred and seventy-five institutional members of the *National Association of Trade and Technical Schools* responded to the questionnaire sent to 475 NATTS-affiliated schools. Although the replies in respect to the existence of special programs for foreign students are somewhat unclear, it is certain that no less than eight schools have programs designed to serve a foreign student clientele. Two of these train pilots; two train aircraft maintenance technicians; two cover diesel mechanics; and the remaining pair are in drafting and transportation management. Thirty-one of the schools attest to having had a foreign government training contract, although it cannot be determined whether the contracts involved unusual curricula.

A most informative fact is that 213 of the responding schools have trained foreign students, one as many as 400 in a single year and 10-15 being the average number. It is also worth noting that almost all the respondents hold that all of their program offerings are or would be relevant to the needs of developing countries.

Like the community and junior colleges, this group of schools appears to be attracting a growing body of foreign students and should be better known by those concerned with the future directions and quality of international education. At the moment, even the basic census of

---

[2]This point was well made recently in a Science editorial by Lawrence Barrell, President, Hartford State Technical College, and K. Nagaraja Rao, Senior Research Associate, Center for Policy Alternatives, MIT. (September 22, 1978)

foreign students does not reach the NATTS institutions, to say nothing of the thousands of technical schools not affiliated with it.

In addition, and as noted above, the Conference panels will discuss the results of the survey conducted among *departments and schools* associated with individual disciplines. It should suffice here to report the number of returns and special programs for foreign students and to make one or two general observations about the replies.

SUBJECT	SCHOOLS SURVEYED	RESPONSES	SPECIAL PROGRAMS
Engineering	84	32	10
Graduate Nursing	117	69	1
Public Health	6	4	4
Allied Health Professions	132	42	3
Business Administration	49	26	5
Economics	74	30	13
Biology	67	24	1
Chemistry	67	27	0
Physics	67	28	6

Like the returns from the junior colleges, a fair number of the fields-of-study returns call for more information about individual country needs in relation to the specific disciplines in question. Although there are many institutions which would like to inject LDC-related material into their instructions, they have neither the required information about individual country needs nor the wherewithal to finance special activities that benefit only a few students. That is the essential problem for these schools and departments which have only a handful of foreign students. For them the answer would seem to be, at least at the graduate level, a more flexible set of curricular requirements and a means of encouraging students to conduct research on home country problems.

There is a substantial body of opinion within all of the disciplines, however, which maintains that the existing curriculum is fine for most foreign students. This opinion is probably most prevalent in the sciences, the health professions, and engineering. There is also the point of view which holds that to offer special programs for foreign students somehow sets them apart in what may be seen as a segregated and, perhaps, inferior, curriculum -- a counter argument curiously like the one sometimes heard in opposition to the promotion of appropriate technology in the LDCs.

B. Views of Relevance from Abroad

The richest harvest of information from abroad came from U.S. Cultural Affairs Officers and their Embassy colleagues, drawing in part, at least, on reactions solicited from local officials. Sixty-six U.S. Embassies in developing countries received the basic letter; 31 replied. Their responses are summarized by country in Chapter II.

Responding to the question about important fields of study for local students, they identified the following in order of priority (omitting fields that were not listed at least eight times):

1. Agriculture
2. Engineering
3. Business Administration
4. Health Care
5. Economics
6. Science
7. Education
8. Engineering-Technologies
9. Public Administration

This order is particularly noteworthy in regard to the position of agriculture. It has historically attracted relatively small numbers of foreign students, only 3 per cent of the total population in 1977-78. In view of the urgency of the race to boost food production and the consequent weight given to agricultural studies by government planners and our own cultural exchange officials, it is strangely contradictory how few students in this field we host from the developing world.

Concerning the strengths and weaknesses of U.S.-trained graduates, a third of the Cultural Affairs Officers reported that U.S. graduates were especially valued for their practical bent and highly developed problem solving skills. An equally large fraction simply attested to the high regard in which these graduates were held. Knowledge of the English language, superior technical competence and self-confidence are three other specific advantages which, according to several CAOs, are possessed by alumni of U.S. institutions.

The only weakness that our informants were able to find among the returnees was that they were occasionally freighted with knowledge too advanced for application to local conditions. This complaint, passed along by less than half the CAOs, became the basis for several of the recommendations about how U.S. education could better serve the LDCs. Leading the list was a call for modified academic programs that would emphasize the conditions and needs of the students' homelands. Attracting more students in the sub-professional technical fields was also strongly urged. Additional recommendations from the CAOs are listed below:

- U.S. universities should collaborate with LDC institutions to promote exchanges and joint research

- Stronger student counseling and orientation should be provided

- Better ways should be found to teach the English language to incoming foreign students

- More fellowships and other forms of financial help should be offered--a subject on most of our correspondents' minds!

The solicitation of views from LDC Washington embassies was less successful because of the time element. Most of those that answered informed us that they were seeking the advice of the appropriate Ministries at home, none of which had answered at the time the preliminary paper was prepared. Some embassy people, however, did indicate the fields they believe are, or will be, important for their students to pursue in the U.S. In order of relative weight, they are:

1. Engineering
2. Agriculture
3. Health Studies
4. Business Education
5. Science
6. Economics
7. Technology

(A number of replies from Ministries were received after the Conference. These responses are included in the country-by-country summary in Chapter II.)

Although there were too few cases in the embassy responses on which to base convincing conclusions, it is worth noting that, again, agriculture is high on the list, as are health studies, both of which enroll relatively few foreign students in the United States.

Epilogue

It should be reiterated that this paper has been prepared primarily to introduce conference attendees to some of the subjects and issues that will be discussed at the curriculum session of the conference and to report, in a rather cursory way, some of the findings of surveys conducted for the several fields-of-study panels.

Those responsible for organizing the conference are particularly hopeful that it will contribute to the UN Conference on Science and Technology for Development and to the preparation being made for it by the Office of the U.S. Coordinator for UNCSTD in the Department of State. The session on curriculum for foreign students should have a considerable bearing on the UNCSTD, since so many of the students now in the United

States come from the developing countries and pursue studies here in fields directly related to science and technology.

Conference organizers also foresee the possibility that the conference and its summary reports will help to guide the development of the incipient Foundation for International Technological Corporation, which is likely to be a major part of President Carter's new structure for international assistance and a cornerstone of the U.S. contribution to UNCSTD.

The immediacy of the relationship between the conference and these two important events both enhances the significance of the conference deliberations and heightens the responsibility of all of those involved. It also points to the need for precise and practical recommendations from the conferees and for a conference report that clearly and fully conveys them to a larger audience.

CHAPTER II: THE VIEW FROM ABROAD

Curriculum: U.S. Capacities, Developing Countries' Needs

by Davidson Nicol

(Speech delivered at Plenary Session)

The Institute of International Education must be congratulated on bringing us together for what must surely be one of the most important conferences on this subject. The careful preparatory work which Dr. Richard Myer, particularly, and his team have together put into a conference and the statistics which have been amassed will lay foundations on which sound planning schemes and projections for the future can be built. The wide and distinguished circle of experts gathered here this week testifies not only to the reputation of the I.I.E. but expresses the concern shared with them by many on the importance of this subject.

My co-speaker, Dr. Harold Enarson, as an example, has given and continues to give great leadership to an institution, Ohio State University, which is not only outstanding within the United States as a major institution, but also has an extensive program for some 1,350 students from 96 countries with over 300 foreign student families and several hundred post-doctorate faculty and researchers. It has a personal place in my family also as the alma mater of my elder and only brother now in Sierra Leone.

The latest report on international student exchange prepared by the Institute of International Education in collaboration with a joint task force on data collection gives a very useful survey of the present position. There are about a quarter of a million foreign students in U.S. colleges and universities, a figure which has steadily risen in the past few years and has increased at a rate higher than that of the native student enrollment. The greatest number of students is in California, more than a third, which incidentally confirms a good judgement about meteorological conditions on the western coast of the United States. My point, however, is that foreign students are going to institutions all over the country instead of concentrating in a few locations. An increasing number are attending two year institutions such as junior colleges and community colleges. More than half of the students were from the continent of Asia and nearly one third came from the member nations of the Organization of Petroleum Exporting Countries including the Asian OPEC nations. Those who have doubts about the United States being a revolutionary country

Davidson Nicol is Executive Director of the United Nations Institute for Training and Research (UNITAR) and Under-Secretary-General, United Nations. He is a former rector of the University of Sierra Leone.

will have those doubts removed by being informed that the greater number of students, about 36,000, came from Iran than from any other country. Africa has about 12.6% of the students, Europe 8.2%, Latin America 16.5%, and North America 5.5%. Eighty (80%) per cent of the students either paid for themselves or were paid for by their government. The fact that most of the students were from OPEC countries again inclines one to the belief that this may be due to the fact that university and college education in this country has become so expensive that only certain countries, wealthy developing ones, can afford to send their students here.

There is another interesting figure, and that is that only 10% of the students are paid for by university or college grants in this country - a complete reversal of the situation 30 or 40 years ago when the United States was the Mecca of enterprising but poor students from all over the world who believed that they could pay their way through college by hard work during the vacations and in the evenings. Some of these students rose to great positions in the Third World and became heads of state and heads of government. The fact that they can no longer do so, but must come under the auspices of governments, some of which they may oppose, is indeed a matter for regret.

There should always be room in the United States for overseas students who show brilliance and hard work and who may not come from wealthy backgrounds and may not be backed by their governments, but have shown promise by saving a small amount of money themselves to begin their education and who can only continue their education through ability and the provision of opportunities by universities and colleges for them to pay their way.

It is pleasing to note that the proportion of females is high and that the ratio is 3:1 of male to female and that an increasing number of female students enter four-year institutions.

The total number of undergraduates just outnumbers the number of graduate students, the increase in undergraduate being primarily due to the fact that more foreign students are now going to junior colleges to do courses sometimes not offered by the larger institutions.

The percentage of foreign students in some institutions is high. Foreign students account for about 20% of the total enrollment at Howard University, a predominantly Afro-American institution. About the same figure at the Massachusetts Institute of Technology, primarily a graduate school, and just below that figure at Texas Southern University.

About 42 institutions have a thousand or more foreign students and this total represents about a quarter of the foreign student population in the United States last year. Harvard University is the ivy league institution which has more foreign students than any other institution of that type.

What do we from the developing countries want from U.S. education which we do not at present have? Or what do we need in addition? UNITAR recently published a report on the brain drain. The report by William Glaser indicated that when asked the reasons why they decided to study abroad, 57% of persons from developing countries who replied said that one of the reasons they did so was because they thought the level of training abroad was superior to that offered by their country of origin, and 61% said one of the reasons was because in their particular field, at their particular level, they thought the facilities abroad were superior to those offered in their home country. This was particularly true of persons who studied in the United States where 66% said they did so because they considered the level of training superior, and 75% said they did so because they considered the facilities superior. While other reasons were cited, none were cited by such large percentages of the people included in the survey. These facts are not without interest when one considers the significance and relevance of study in the United States for students from developing countries.

First of all, we must make clear certain facts. American universities and colleges were built and structured for Americans and not for foreign students, and their primary duty is to educate U.S. citizens. The education of foreign students is and will always remain a secondary concern to their governing bodies and their state legislatures. To the developing countries however, an American education of their students may be a primary concern.

Next, although American education is valuable to students in the Third World, it can no longer be considered as an act of charity. The Third World pays for the education of its students and, therefore, it expects the best that can be given them. It cannot in many institutions pay enough on a commercial basis to cover all costs, nor would the universities wish them to do so. But on a purely financial basis it is mutually beneficial to both the U.S. and the Third World that some adequate arrangements be made for their students.

Much of the foreign policy of the U.S. and developing countries in the twenty-first century will depend on the education imparted both here and abroad and the friendships formed by young people at American institutions. The friendship and understanding between faculty and Third World students and by American faculty and students working and studying at overseas universities, such as at my own Fourah Bay College in Sierra Leone, are more rewarding in every sense of the word than all the work of intelligence agencies on college and university campuses.

In fact, in Europe and the United States, some small institutions are financially viable only because they attract overseas students from OPEC countries. Again from the economic point of view, graduate students from wealthy developing countries who have been trained with American instruments and machines will prefer to buy their

computers and oil drilling apparatus from this country and not from Germany, Japan, or Eastern Europe. They are not being trained here because of that but, it is not a negligible consideration. Even when the country is as poor an LDC as Libya was in the 1950's, its future may suddenly become of major importance. Most of the mineral wealth of the globe is in the developing countries. In the next decades the position of the African countries, for example, in this regard will be of crucial importance. Familiarity with American engineering and business management procedures will be commercially advantageous and more long-lasting. I mention these facts because State legislatures and Treasury departments do not always see the education of foreign students in the idealistic way that educational authorities do. They sometimes become interested only when advantages of this type are pointed out to them.

I do not think that the education of the foreign student in the U.S. should begin when he lands at New York or San Francisco airport. The needs of the least developed countries with respect to the United States should begin in the countries themselves. They should be encouraged to draw up planning schemes which take account not only of the nation but also of the region. Their manpower, including womanpower, requirements need to be calculated for a ten or twenty year period. The figures may not always be accurate but they will give some indication of needs and are better than working in the dark. In drawing up humanpower requirements, local authorities will of course be included in planning when this is done by external advisers, and the requirements should always be a little more than required since progress is always a mixture of reason and faith.

It is from such planning that nations should design the thrust of their educational systems. It is as one end result of such educational planning and after full use of national and regional institutions that the decision to send students to the U.S. should flow. Ideally U.S. cultural officers or established U. S. university officers should join with local educationists in interviewing students. The decision must always rest with the university authorities to grant admission and not with the U.S. or local government.

Orientation courses both in the home country and in the U.S., however brief, are advisable. Students should be told that apart from academic groups and artistic and theatrical circles, the U.S. is a country composed of different communities, sometimes of the same colour but living in their own separate neighbourhoods with their distinctive foodstores and places of worship and that the aim is for respect for other communities and equal opportunities for economic, political and religious fulfillment. It helps the foreign students through many misunderstood situations to know that the average U.S. citizen feels happiest in his or her own community and that this does not imply hostility to others but includes welcome to foreigners.

In spite of possible unwillingness of the government and of the individual, it is useful to persuade foreign students to do aptitude tests and to learn English properly, or English-speaking foreigners to be familiar with the American variety. We should remember however that the pace of development of developing countries cannot depend on their knowledge of English and, or French for that matter. All the more reason that the first generation should be given intensive language training as it will be diluted later when they teach others. Later, like millions of Chinese, Japanese, Germans and Russians, they will progress in their own languages without speaking English.

Governments and parents should be persuaded to send wives or husbands with married students who have to take long courses. Homesickness and physical loneliness are thus avoided, the family is not disrupted and the re-entry phenomenon difficulties on returning home are diminished. This calls for accommodation for married students at campuses or university towns, day care facilities - and sometimes marriage counsellors.

Later when the foreign student has returned home, it will be useful for supervisors to continue an encouraging correspondence and to help in sending out books, journals and instruments. Evaluation by employers can be very useful and sometimes more reliable in planning further courses.

Thus a Third World student coming to the United States should be well prepared, have language skills, should have as much as possible some indication of what he or she is going to do when he or she goes back with the prized diploma from a U.S. institution. I know that the various panels this morning will discuss the curriculum requirements of those subjects which are studied by foreign students in American universities. According to our latest statistics, these are: that about two thirds of the students study engineering, business and management, the sciences and the social sciences, and just under a third study education, math and computer sciences, fine and applied arts, the health professions and agriculture, and about 10% study the humanities. But U.S. Cultural Affairs Offices and other embassy colleagues from abroad put a different emphasis on the importance of the fields of study. Agriculture is placed first; engineering, business and administration take their place next; health care comes up and is important as are the subjects next of economics, science, education, and engineering technologies and public administration. The position of agriculture is significant as so few students study it here but its importance is so evident to U.S. officers abroad. In each of these fields, local considerations play a part. In agriculture, agricultural economics, maintenance of agricultural implements and a study of the land tenure system are important. In engineering appropriate and intermediate technologies come into the picture. In medicine, preventive medicine, health legislation, the training of nurses and paramedics, the geographic incidence of certain diseases are other

factors, whatever the specialty. Each subject needs reexamination.

I would like now to dwell on several factors: first that the graduate education of students from Third World countries should not be regarded as a subsidiary part of the ongoing educational development in the U.S. A greater degree of urgency should be applied to it. It should have about it the pragmatism and the relevance of the type of technical education which was given during the war when manpower needs were so pressing and training, being important and a matter of life and death, had to be reduced to immediate and urgent essentials. It is in this connection that we should place importance on NATTS, the National Association of Trade and Technical Schools. Some of these schools have a foreign government training contract and they give short courses, one of them as many as 400 in a single year, and their courses are relevant to the needs of developing countries. The work of this group of institutions should be brought to the notice of foreign governments who still feel that short and relevant courses can only be obtained at junior and community colleges and are not aware of the existence of these trade and technical schools. But it is at the college and university level that we may be more concerned here. Undergraduate education will be difficult to alter to suit foreign students unless they are asked to do a junior year abroad in their own countries or in another developing country. If this is done side by side with other American students it will assure the foreign student that the quality of the degree is the same for a student from Minnesota as it will be for a student from Morocco. The significant number of students with which we are usually most concerned are graduate students who have finished the course of education at their own universities and have come to the United States to study for a Master's degree or doctoral degree. It is my belief that the basic requirements of the two or three year pre-doctoral education for these courses, are sometimes more of significance and importance to these students than their dissertation as it is a means of furthering their specialist education. The next step, that of their dissertation, calls for careful planning. We should perhaps make it possible for American post-graduate students to follow the German pattern, that is, that they should be able to transfer to other universities or centers of relevance and excellence, if it is necessary for them to do a dissertation not covered by an expert in that field at the American university where they first started studying. These centers can be established by groups of universities (if they do not already exist) under an expert and by joint financing in much the same way as area studies are done.

An extension would be to establish institutes or joint schemes with overseas universities as has been done in some cases already. These overseas extensions again should be used by American and European graduate students also or they will be relegated psychologically, if not in fact, to second class status.

Again, although the subject of their dissertation is relevant, it appears to me that the method of approach to the subject, the familiarity with the instruments and apparatus and their maintenance and with modes of research are as important as the subject of the dissertation itself. Even in the developed countries many doctoral students do not return to the subject of their dissertation but turn to something else in the same field. This is more the case with students from developing countries than otherwise. A doctoral student sometimes does a highly specialized piece of research which he cannot continue in his country, but if he is trained to be flexible and imaginative in his approach he can apply the same thoroughness and scholarship to local problems when he returns home.

There are certain measures which can be undertaken to improve the relevance of curriculum to the needs of foreign students. There can be an exchange of professors in subjects most usually studied by foreign students and by foreign student advisers. This should be kept distinct from professors who wish to go overseas to carry out their own research. Both are not incompatible, but the first consideration should take precedence. It will enable the U.S. professor to understand the local system of education and also to advise foreign students better. It will be more useful if the professor works with local colleagues and under local university presidents with conditions, if possible, similar or comparable to his colleagues. He will then cease to be a tourist or peripheral adviser and will be an accepted inside member of a team.

The Third World professor will be able at an American university to explain the needs of his region to the faculty and could act as an adviser to foreign students in telling them what will be possible or impossible when the student returns home. The Third World professor or university administrator may, if he belongs to the older generation of former colonial territories, be more familiar with the European pattern of university education, and his stay will give him an opportunity to correct his impressions which may have been influenced by the adverse misconceptions a few European university authorities still have about American higher education.

On the other hand, the Third World or American holder of an American Ph.D. is not automatically familiar with American higher education and university administration.

Every Third World student should receive some advice and training as to how to communicate his skills. The progress of developing countries will not in the end come through foreign advisers or foreign universities. Numerically, it is impossible; ideologically, it is debatable. It will come from the nationals themselves. Thus all graduate students should be encouraged to teach or lecture whilst here to fit them for training others on their return. Those destined to university teaching can be given the privilege of attachment for short periods to chairpersons of the department, to deans of

faculties or the central university administration before going home. This experience, however short, with a decision-making individual or group in the U.S. may have a seminal and catalytic influence through graduate students on tens of thousands of students and young people in their own countries.

Our task in major conferences like this lies in the midpoint between a planned and well adjusted entry into the American education and a satisfactory re-adjustment on return home. Every phase is important.

The vacation work or internship of overseas students needs careful planning. Sympathetic faculty and university administrators often have not the time, the money or the guidance to do this. Certain suggestions are possible.

It may be that in the long run, vacation experiences are more important than the subjects they studied. The activities of the late Kwame Nkrumah, President of Ghana, and Dr. Hastings Banda, current President of the economically stable African republic of Malawi, in the black churches in the ghetto areas of American cities during summer vacation taught them oratory, organising power and political mobilization. The black church as Martin Luther King and Andrew Young were to show, was and is a training ground for political and social activism, during their vacation or indeed during their work.

They should see the developing areas of the United States, the rural communities, the ghettoes and the small towns. They should see the hopefulness and enterprise of development and improvement schemes. It will encourage them when they return home.

It is a matter of American national pride to show students from overseas your great achievements. But they should see the steps which led to them and that the task is yet unfinished. In this way their admiration is mingled with hope and inspiration and not with envy and/or desire.

It would be useful for graduate and undergraduate students, especially the promising ones, to be involved in structured involvement and hospitality with elite Americans, white, brown and black, who are, after all, the leaders. They should also be brought into contact with middle America, union leaders and so-called minorities to get a broader picture.

It might seem an impossibly tall order and, in fact, the foreign student might be too tired or unwilling. They may misunderstand curiosity and unsophisticated commentary for ridicule and contempt. But these are risks to be taken because the long-term rewards in human understanding and international peace and security are so great. The structure of society, the legislative processes and

the ethics and morality of the millions of Americans who do their duty unnoticed by the multitude, over many years, should in some way be brought in front of the foreign student. He should be allowed to participate, however briefly, in it. Apart from their studies, their only exposure is to the media - to Watergate, to Koreagate and the programmed violence of the majority of radio and television programmes, and this is not fair to the United States.

The needs of the developing countries are great. They are working towards eliminating the poverty and illiteracy which hundreds of years of colonialism and exploitation have given them. But we do not look back, we look forward. The concern, interest and generosity of the American educational community are deeply appreciated - and will be reciprocated, if not now, then in future generations.

SURVEY OF U.S. POSTS IN DEVELOPING COUNTRIES

Cultural Affairs Officers in 66 countries were asked to comment on the relevance of U.S. higher education to the development needs of the countries in which they were assigned. Replies were received from 31. The countries chosen were those LDCs and OPEC countries which either had 150 or more foreign students in the United States at the time of the 1976-77 Open Doors census, or which had fewer students but sent representatives to the May, 1978, IIE seminar on foreign-student program administration. The LDCs and OPEC countries were those on the list of "Third World", "Fourth World" and OPEC countries in the Overseas Development Council's Agenda for Action 1976.

The countries are listed in Appendix A. Basically, IIE asked the CAOs to respond to three questions: (1) What fields of study are most important to the country, (2) What do public and private employers in the country see as the strengths and weaknesses of U.S.-trained employees, and (3) How could U.S. higher education serve the country's needs more effectively?

The CAOs were encouraged to enlist the help of the Economic Officer, the Labor Officer, the Agricultural Officer, the AID Mission Director, and/or anyone else who could provide useful observations. A number of them did so.

1. Fields of Study

The fields of study cited as most needed, and the number of respondents citing them, are:

Agriculture: 19
Engineering: 17
Business Administration: 15
Health Care: 14
Economics: 14
Science: 10
Education: 10
Engineering-related Technologies: 8
Public Administration: 8
English: 3
Housing: 2
Social Sciences: 2
Environmental Planning: 1
Food and Nutrition: 1
Rural Development: 1
Population Planning: 1
Social Work: 1
Transportation: 1
Urban Development: 1

2. Comments. (NOTE: These did not fall into clear-cut categories related to the questions about how employers view U.S.-trained personnel and how U.S. higher education could serve more effectively. The following are very brief excerpts from the salient comments. Most of the respondents have clearly given a great deal of thought to the questions.)

AFGHANISTAN

"....One of the main strengths is in the area of analytical abilities of American-trained people. One of the weaknesses with American-trained people is the result of a double standard at particular universities. Some Afghans return from the U.S. with master's degrees or doctorates, and then show that they are not equal to the degrees that they have received. U.S. postsecondary institutions could serve the manpower-development needs of Afghanistan more effectively by paying more attention to cross-cultural issues -- both personal and academic....More emphasis should be placed on developing academic programs which will relate academic content and training to the rural-development needs of developing countries. Too often, Afghans who return do not want to serve...outside of the capital city....."(Director, Afghan-American Educational Commission)

BAHRAIN

"....Fields...most important are agriculture, education, health and sanitation and courses related to construction of low-cost housing. The technology for all of these exists in the U.S. - it is a moot point as to whether these require study in the U.S. Many of these basic courses can be given in the country more effectively....The vast gap between our (U.S.) technology vs. the real world in developing countries is so great that very little of what we have to offer has applicability to the conditions found in developing countries.

"The principal weakness...has been the overriding emphasis on university training, frequently pushing the acquisition of master's and even Ph.D., which more often than not provides the graduate with a passport to better jobs in the States or international organizations ....Instead of pushing higher education we should have provided more emphasis on two-year postsecondary type education designed to provide very practical...skills at the technician level....Postsecondary institutions could probably have the most impact on development by providing those Americans with genuine know-how who, besides the academic credentials, have the practical experience to demonstrate

BAHRAIN (cont.)

in-country the skills needed -- who can and do teach, using the resources available." (Prepared by the Ministry of Labour and Social Affairs of the State of Bahrain)

"Greatest need in Bahrain today is skilled workers and technicians. These needs can be best filled by less than university training in-country....U.S. education and training is highly valued...An MBA from an American university is probably the most valuable piece of paper in Bahrain today." (U.S. Economic Officer)

BOLIVIA

"The fields...most important for Bolivia are Agriculture, Education, and Health....Very often, the fact of being a U.S. university graduate places an employee in a preference situation over other employees....Universities concerned with international education should give careful consideration to language training... This has been a limiting factor in selecting U.S. facilities over third-country institutions." (USAID Program Officer)

BRAZIL

"...it is fairly certain that Brazil will continue to emphasize economic development over social and political development. Education in technical fields, upgrading of university faculties, advanced degrees in financial and economic affairs, and training in agricultural sciences will be priorities....About 70 per cent of all Brazilian graduate students who study abroad will study in U.S. universities, our broad array of programs being a prime drawing point....In the main, U.S.-educated Brazilians are among the country's elite in the work force, especially those with advanced degrees in economics, planning, engineering, physics, and chemistry....Some of the specialized postgraduate programs in American universities do not meet Brazil's current needs for development...A repeated comment by Brazilian officials working in education and manpower training about universities in the United States is that our institutions are inward looking and not willing or able to mold programs for the needs of Brazil. A broad recommendation that could be made for making U.S. institutions of higher learning more responsive to Brazil's current manpower needs is to attempt to be more flexible in designing courses of study for the Brazilian graduate student....It would be advisable...for American universities to enter into direct contact with the Brazilian government with the aim of building cooperating programs....It should be noted that Brazilian education officials find American universities to be very expensive..." (Cultural Affairs Officer)

BURUNDI

"...the needs are almost limitless. Burundi...possesses one of the densest populations in Africa with few if any resources except coffee....The overriding need is for rural development to meet the basic food requirements of a growing population, subsisting by outmoded agricultural methods....A major drawback to study in American educational institutions...is English. As a French-speaking country Burundi has only recently begun to emphasize the role of English teaching in its schools....At present, ICA is assisting in the development of an English program at Burundi University and the Ecole Normale. This is an area where American universities might provide assistance to help create a cadre of students for future study in America." (Public Affairs Officer)

CAMEROON

"...the fields most important to the manpower-development needs are...agriculture, business and petrochemical science...related to the production of fertilizer. All fields clearly call for research and study in the United States...Public and private employers in Cameroon value highly U.S.-trained personnel...The main strength of U.S.-trained personnel is practical, applied nature of their training....Postsecondary institutions in the U.S. can best meet the needs of Cameroon by providing individual scholarships to deserving students. Generally, the technical side of American education is more than adequate to train African manpower -- the real problem is getting students there in the first place." (Cultural Affairs Officer)

CHILE

"Since the establishment of the Fulbright Commission in Chile in 1956, approximately 750 Chilean graduates in all fields except medicine, nursing, and odontology have obtained their Master's and/or Ph.D.'s from U.S. universities. The performance of these graduates, according to IIE reports, has been unusually high, and the number of non-returnees low -- 4 to 5 per cent....Of the public and private Chileans having greatest influence on national economic policy today, most have obtained their Master's degrees from the University of Chicago....Chile now has two generations of graduates from U.S. universities who are professors of high standing in Chilean universities or who are working as managers, planners, project engineers, etc., in the public and private sectors." (Cultural Affairs Officer)

CHINA, REPUBLIC OF (TAIWAN)

"...professional staff with master's or doctoral degrees in the fields of engineering, especially in mechanical, civil, and chemical engineering, as well as experts in management science are needed.... The quality of the U.S.-trained employees is recognized to be high.... However, we hope U.S. postsecondary institutions will put even more emphasis on practical experience in the field, and the knowledge and know-how in medium-scale construction management....To help meet the growing manpower-development needs of this country, U.S. postsecondary institutions may be advised to...(1) strengthen practical training.... (2) offer teacher training to students, so they may become technical college or senior technical school teachers...(3) cooperate with local educational institutions and enterprises to promote exchanges of publications and teachers..." (Ministry of Education, Taiwan)

COLOMBIA

"Engineering, economics, business administration, about in that order...U.S.-trained employees get high marks, the highest. This does not necessarily mean we give the best training, but...the U.S. has been the 'in' place...English language, of course, also, has become the world language....I've often heard the complaint that U.S. producers in offering technology don't give proper attention to problems of scale...the theory...is sound, but how to adapt to a very different situation back home?" (Economic Counselor)

"Most important careers are Engineering, Economics, Architecture, Medicine, rural careers (Agronomy, Animal Husbandry, and Veterinary), Sociology, Arts and Sciences. For study or research in the U.S.: Engineering, Economics, rural careers, Medicine. Public and Private Employers' Thoughts (about U.S.-trained personnel): Weaknesses: Too much emphasis on labor elimination; seminars, thesis work and other papers not carried out on Colombian problems; very little interest on approach to problems of other countries. Strengths: Teaches individual to work hard; gives hope for the future to individual; teaching system not made for geniuses...Better Serve the Country's Needs: Having students always under advisors and these advisors being acquainted with Latin American problems; forcing students to work on Colombian problems; having more material on Colombia available at college libraries." (USAID Mission Director)

"Strengths (of U.S. education) are the discipline at labor and methodical approach to problems....A very effective way to help manpower development...is short, intensive courses on specific subjects." (Agricultural Attache)

COLOMBIA (cont.)

"Employers in Colombia think highly about U.S.-trained professionals when they have received undergraduate education in Columbia and graduate work in the U.S.....Perhaps the most common weakness of U.S.-trained professionals is their lack of knowledge about what is possible...in Colombia, and what is not. ...The best way to improve the training U.S. colleges and universities offer foreign students would be to set flexible requirements for degree completion, more closely related to their country's situation, and not necessarily the same as required of U.S. students. More financial help opportunities is another way of improving effectiveness...." (Director, Fulbright Commission)

COSTA RICA

"...there is general satisfaction (with U.S. education) -- in fact, the usual complaint is that we aren't providing enough opportunities (i.e., scholarships). The main strengths...are the good command of English which it entails, and the emphasis...on practical thinking and problem-solving. The only drawback is that people...are somewhat out of touch with Costa Rica and the way things are done here when they first return...but this is...a temporary and easily overcome handicap. As to the immediate manpower-development needs of Costa Rica, I think they would be chiefly in the agriculture and industrial engineering fields." (Second Secretary)

DOMINICAN REPUBLIC

"The level of postsecondary education in the Dominican Republic has...improved in the last few years with the opening of a number of universities. ...There are, however, several areas where... U.S. undergraduate training is sought: Chemistry, Physics, Medical Technology, Nursing, Management, Public Administration, and some areas of Engineering. At the post-graduate level, the following fields are important: Medicine, Economics, Engineering, Agriculture, Administration, Education.... U.S.-trained employees are generally highly regarded....Some employers consider the training received in the U.S. too sophisticated for the actual conditions existing in a developing country....This is especially true in research areas, where trained technicians returning from the U.S. are faced with severely limited facilities and budgets.... A stronger recognition by U.S. institutions of these considerable differences and willingness to include training for different levels of development would assist in alleviating this problem....This is not a problem for all....Many find their training more than adequate for the local situation....The most effective way U.S. postsecondary institutions could help serve the Dominican Republic's manpower-development needs would be to provide more opportunities for Dominicans of all

DOMINICAN REPUBLIC (cont.)

economic class levels to study in the U.S. The need is great, the interest substantial; what is lacking is the financial means to do it." (Cultural Affairs Officer)

EGYPT

(Attached a detailed study of more than 600 AID participants who studied in the U.S. within the last three years.)

"Another source of information is the Egyptian-American Joint Working Group in Education and Culture (JWGEC). The Egyptian participants are among the outstanding men of the country. Their interests are the following: (1) Transfer of modern technology in fields of science and engineering. (2) Health. (3) Education, with emphasis on modern teaching methods and materials. (4) Public and Business Administration. (5) Population Planning." (Cultural Affairs Officer)

GHANA

"...the higher education advantages of the United States are recognized and respected in Ghana...The Ghanaian Government, through its Scholarship Secretariat, is funding 236 students from its meager foreign exchange holdings. And, the secretary to the Ghana Manpower Board revealed to me that for the foreseeable future Ghana will place high emphasis on science education, including vocational training if it is at the university level. Obviously, the United States excels in both areas. In addition, the University of Science and Technology at Kumasi has committed itself to conversion from British-style autonomous faculties to the American modular system. And, a fourth university on the planning boards...will be American style from the day it begins classes....I cannot avoid bringing to your attention the real and serious physical and material hazards to successful completion of educational projects in Ghana today. The shortage of, and high cost for, basic daily necessities is truly a discouragement. Hopefully, the universities will have returned to a normal school year schedule... during the next 18 months we shall also see a return to civilian rule and a test of whether political parties can pull the country out of its present economic crisis..." (Cultural Affairs Officer)

INDIA

"...except in certain very specialized fields, there is no compelling need for a student to come out of India for higher education. But in fact there is an almost insatiable desire for study abroad, particularly in the United States, and this does not represent merely a desire to travel. At the most fundamental level it represents an awareness of two things. The first is that the modern Indian educational system is largely derivative from the west....particularly in the social sciences....There is a very strong feeling of the need for renewal of contacts, for cross-cultural work, for dialogue with foreign scholars. Secondly, there is an awareness that in science and technology at the most advanced levels...the United States offers training and research facilities that, even where they exist in India, can accommodate only a small number of those who seek such training.... The main criticisms of American-trained specialists are....(1) They do not wish to return to the hard conditions of India. This is a particular...criticism of medical doctors...(2) American techniques are unsuited to Indian conditions...Many Indian scientists, while recognizing the validity of the concern, reject the conclusion that Indians can serve Indian conditions by something less than the most modern training. One cannot stop modern scientific and technological training, it is argued, at some half-way point..." (Cultural Affairs Counselor)

GUYANA

"The fields of postsecondary study considered most important to the manpower needs of Guyana are (a) agriculture and the agricultural sciences plus allied fields...such as veterinary medicine and animal husbandry; (b) the physical and applied sciences and technologies (engineering, mining, geology, forestry, fisheries, and vocational education); (c) medicine (general and specialized paramedics), public health (especially the delivery of public health systems), hospital administration; (d) Management; (e) Economics (particularly planning, money and banking, fiscal policy, statistics and statistical analysis).

"Although most (employers) readily concede that training in the U.S. is of a high quality, they do not all agree that it is... relevant to the developmental needs and goals of Guyana as manifested in the country's socialist thrust. Toward this end, the government of Guyana during the past three years has sent increasing numbers of Guyanese for training to socialist countries such as Cuba, the Soviet Union, East Germany, Yugoslavia and North Korea. U.S.postsecondary institutions should seek to demonstrate more forcefully that their programs of study and research are relevant to the developmental goals of the country. Such institutions should also investigate how they can assist in helping U.S.-trained employees to make the accommodation, adjustment, and adaptation to the conditions of the environment in which they will have to work...." (Public Affairs Officer)

HONDURAS

"Fields considered most important to manpower development needs: Business Administration, Agriculture and Animal Husbandry, Public Health and Medicine (Specializations). All are likely to call for research or study in the U.S., U.S.-trained employees are considered to be more technically competent than local university graduates. They are given job preference in both the public and private sectors and are paid higher salaries. (Perhaps as much as 50% more.) Those who have studied in the U.S. are also rewarded for having mastered a second language. Ways to serve manpower development needs more effectively: Offer more scholarships....." (Cultural Affairs Officer)

JORDAN

"...Approximately 80 per cent of the staff of Jordan University hold Ph.D. degrees from American institutions. Today some 5,000 Jordanians are pursuing higher studies in the U.S.A. The U.S. educational system has served Jordan's development needs very well through the years. Jordan has also become a major exporter of trained manpower. Today some 300,000 Jordanians work outside the country, mostly in the

JORDAN(cont.)

Arab Peninsula. They collectively repatriate a large amount of capital which is injected into development-related industries in Jordan. The Minister of Education told me recently that 700 million dollars was repatriated through this channel last year alone....Furthermore, one-third of the population of Jordan is currently in school. The importance of the U.S. contribution to educating Jordanians thus becomes obvious.

"The engineering sciences continue to attract the bulk of students.... There will probably be new opportunities for the American postsecondary system to become involved to a greater extent in para-professional training, particularly in the engineering sciences...new demands in Jordan and throughout the area have underscored the need for expansion of the para-professional base....Last year a new private technical college opened in Amman and its enrollment is five times what was anticipated....The bugaboo of the post-secondary foreign student continues to be problems with the English language...Jordanians would like to see more universities set up English-teaching programs for their own foreign students....There are a host of commercial (English-language) institutes with slick brochures and hefty fees. Many students gain entry...only to learn later that the American Consul is very reluctant to give visas to students who attend such institutes...The third area of concern is related to student placement generally. The last five years have witnessed a geometric growth in the counseling business overseas, particularly in the oil capitals. All too often the organizations doing the counseling are poorly prepped...or simply unethical...U.S. colleges and universities become willing partners in unethical practices such as blanket authorization for issuing I-20 admission forms....It is time that higher education officials in the U.S.A. work out a systematic approach to the foreign student and work out accreditation guidelines for the placement institutions!...Many forlorn students pay handsomely for poor-quality counseling and unethically issued I-20s...." (Cultural Affairs Officer)

KENYA

"The Ministry of Education recently (August 1, 1978) sent USAID a list of 21 priority fields as follows: (1) Medical Science, (2) Dentistry, (3) Pharmacy, (4) Public Health, (5) Medical Technology, (6) Engineering (all forms), (7) Agriculture, (8) Veterinary Medicine, (9) Soil Sciences, (10) Forestry, (11) Architecture, (12) Education, (13) Accountancy, (14) Paper Sciences, (15) Hydrology, (16) Population, (17) Urban/Rural Planning, (18) Survey/Photogrammetry, (19) Environmental Sciences, (20) Natural Sciences, (21) Biological Sciences....U.S. training

KENYA (cont.)

is not only highly thought of but also highly sought after by Kenyans at all levels...U.S. institutions could better serve the postsecondary needs of Kenya by offering more scholarships. Many young Kenyans write to U.S. colleges and universities and gain acceptance only to discover that the institutions do not offer financial assistance.... Another way certain institutions can...serve...is through maintaining closer contact with returned students." (Cultural Affairs Officer)

KOREA

"Most of the postsecondary study in the United States directly related to development goals has been under the aegis of USAID.... Since Korea has reached middle-income status, the AID program is now in the process of phasing down...Korean manpower training in the U.S. definitely contributed its share to the outstanding economic progress... in Korea. Employers consider their U.S.-trained employees, whether in industry or agriculture, as outstanding credits to their organizations. Exposure to a modern agricultural economy such as the United States' broadens a Korean's outlook and lets him accept solutions unknown in the Korean experience. A weakness...is the fact that U.S. training institutions use tools and equipment unavailable in Korea and thus do not allow U.S.-trained Koreans always to put into practice what they have been taught. Two areas have been emphasized in respect to agriculture: economics and agronomy....An area needing assistance is that of the agricultural media. Korea is weak in the application of communications techniques as applied to agriculture, and experience in the U.S. in this field would be beneficial." (Public Affairs Officer)

KUWAIT

"In the process of nation-building Kuwait would like to diversify its industrial base beyond the petro-chemical industries....Kuwaiti citizens (46% of the population) control all business enterprises but employ many expatriates (54% of the population). ...The largest non-Kuwait group consists of 250,000 Palestinians...The main ingredient of national policy is 'Kuwaitization' -- the conscious desire to replace expatriate know-how with Kuwait know-how. Consequently, education...is high on the Kuwait list of priorities -- more than 26% of the population in Kuwait consists of students. Of Kuwaitis alone (not counting expatriate Arabs living in Kuwait), it is estimated that 5-6,000 have graduated from American universities....

KUWAIT (cont.)

The Kuwait University itself has a student body of 9,500 -- all on the undergraduate level. Approximately 52% are female.

"Fields of importance in postsecondary education include business administration, economics, engineering. Medicine is also important... but it is preferable to study in one's mother tongue, Arabic. Hence most students go to Cairo. U.S. trained employees are highly respected.... A British degree is also valued. The American system of education is highly respected, to the point that Kuwait University has adopted the elective system. Actually, American training is considered to be more complete and our outlook more modern in the problem-solving field. You might consider efforts to assure that Kuwait students can obtain summer jobs (interships) with U.S. firms. Such practical experience would be invaluable -- but you may have trouble so convincing the student. This is a nation of merchants and all of the major Kuwaiti families are in some form of commerce." (Public Affairs Officer)

MOROCCO

"...The real problem...is financial. The cost of a U.S. education is simply well beyond most Moroccans' means, and the Moroccan government, so far, has not seen fit to allocate very large sums from their own scarce resources...Moreover, as a recent visiting educator said, 'They do not understand why the United States government does not allocate a given number of scholarships to Morocco each year as does France, the U.S.S.R., and some other countries...' The fields of postsecondary study considered most important to the manpower-development needs of Morocco are: Administration and Management (Public and Private Business), Agriculture and Natural Resources, Technological Sciences, and Urban Development and Housing. The three most likely to call for study or research in the United States are Administration and Management, Agriculture and Natural Resources, and Technological Sciences.... While Moroccan holders of U.S. degrees sometimes experience initial difficulty in obtaining appropriate employment, they appear to move upward rather quickly. In fact, a number of Moroccan graduates of American universities have risen to prominent positions in the Moroccan government, in universities, and in the private sector....With the exception of an AID-sponsored agricultural training program at the M.S. and Ph.D. levels linking the University of Minnesota and Morocco's Institut Agronomique et Veterinaire, now in its seventh year, there are few ties between Moroccan and American academics or between Moroccan and American postsecondary institutions. The development of more ties of this sort through the exchange of professors and students would be beneficial to all concerned. Also, U.S. postsecondary institutions might well give more attention to developing programs and courses that have greater direct application to Morocco and Moroccan development plans...." (Cultural Attache)

MOROCCO (Cont.)

"...Since the inception of USAID training activities in 1958, nearly 1,000 Moroccans have been trained, mostly in the U.S., in a variety of fields...Generally speaking, most USAID-sponsored participants... are fully utilizing expertise acquired during training....While their number..is small in comparison to the thousands of Moroccans trained in Morocco and in Europe, mainly France, their impact is all the more valuable since most of them are senior or medium-level officials who are effectively involved in project policy-making, supervision and/or actual implementation..." (Director, USAID Mission)

NEPAL

"...USAID/N has trained upward of 2,000 Nepalese over the past 25 years in nearly all academic disciplines and for various periods and degrees. Results of this training can be seen at all levels and in all major institutional settings....In institutional development programs, such as the Institute of Agriculture and Animal Science, some personnel are being trained to the Ph.D. level, but even in those cases, most training is to the M.S. level. There is more concern with services that require sub-professional (in our terms) training, such as para-medics, field workers in agriculture, health, family planning, etc...(The Nepalese Government) is looking more to training in other Asian countries, where comparable training is vastly cheaper...and where they view the training as more appropriate in many cases....Specialized training in the U.S. is often too highly computerized, model oriented, and too sophisticated for maximum use in Nepal....Agriculture, health, family planning, education, and administration (including planning and evaluation) would probably rank high in most lists. (Nepal) is now putting much emphasis on remote and rural area development, and this requires training in a wide variety of fields, and at many different levels, most of it at sub-professional levels....Undoubtedly the biggest continuing need for training in the U.S. will be in agriculture, but even in that field, vastly more will be done in third countries than in the U.S..... USAID is supporting an 'education skills' project which is emphasizing skills rather than a degree, and the length of training cannot exceed 18 months. Most training is for even shorter periods...

"It is repeatedly said by officials of Nepal,by our U.S. Ambassador, and in reports, that perhaps the most effective long-range contribution USAID has made to Nepal is through its training programs....Personnel trained in the U.S. have been very largely responsible for the development of the educational structure, the agriculture management system, and many other institutional structures....However,...one of the growing concerns is lack of 'relevance'...particularly in the case of programs using computers and other highly sophisticated technology....Major

NEPAL (cont.)

strengths (of U.S. higher education) are considered to be the ability to articulate points of view and make clear concepts and approaches. The emphasis of many programs on problem solving is also seen as a major strength...independence of thought is also mentioned....The U.S.-trained Nepalese is ordinarily viewed as competent in his technical area, and he/she usually is." (Chief, Office of Human Resources Development, USAID)

PAKISTAN

"In general, the Government of Pakistan gives priority to training in the science and technology fields....U.S.-trained employees are very highly regarded in Pakistan. They are in key positions in virtually every important government department and private institution. Also, students given an opportunity to study abroad prefer to do so in the U.S. The government offers about 100 scholarships a year to merit scholars and though they are free to study anywhere in the West, virtually all of them opt to study in the U.S." (Cultural Affairs Officer)

"The fields of postsecondary study considered most important to the manpower development needs of Pakistan are business and public administration, engineering, communications, financial management, population planning/demography, education, agriculture, public health/nutrition, and economics. ...It is our judgment that...employers in Pakistan generally think highly of U.S.-trained employees. Those that do attain the degree generally return with more knowledge and self-confidence, to positions of substantial responsibility and status.... U.S.-trained Pakistani employees probably studied in academic programs more directly relevant to the American context than to the context of Pakistan....At least part of what they studied may have little relevance to conditions prevalent either here or in any other poor country. U.S. postsecondary institutions could serve Pakistan's manpower needs more effectively if they tailored their academic programs in such a way as to address more directly the conditions specific either to South Asia or to other comparable regions..." (Acting Director, USAID)

"Not surprisingly, perhaps, I feel that studies in the agricultural area are most important for the manpower development needs of Pakistan. I feel...there tends to be too much emphasis on advanced (Ph.D.) degrees which are limited in practical usefulness for most in Pakistan where indivduals have to work....This leads to demoralization...of the individual who has studied for years in a specialized field....I would stress more study at less advanced levels." (Agricultural Attache)

PERU

"If the aim of U.S. postsecondary institutions really is to better serve the Third World's manpower-development needs, then IIE or a similar organization should create a permanent interface with each nation's planning office. The type of information needed is readily available. IIE could thus provide a valuable service to U.S. postsecondary educational institutions by informing them about what is needed." (Cultural Affairs Officer)

PHILIPPINES

(NOTE: The following comments were received after the rest of the responses had been summarized. Hence, they are not included in the numerical summary given at the beginning of this report.)

"(1)...the most important fields...are the basic sciences and their applications in national development. While development demands a greater number of applied-science practitioners, still the upgrading of our basic science programs...is the most urgent activity...Training abroad is a most desired value....The bulk of the most highly trained manpower in the Philippines have been trained in the U.S. (2) Employers ...would prefer foreign-trained manpower. However, there are certain drawbacks....While professional and technical effectiveness is considered a strength, it also has deep implications in the cultural dimension....Local perceptions of professional and technical effectiveness are certainly different from those of the very advanced societies from which such values have been acquired by the foreign-trained manpower. (3) I would like to see U.S. institutions developing programs in which their faculties could be sent to the Philippines and participate in the training of manpower in situ....Programs developed within and relevant to local milieu would be more meaningful. The American faculty would also become more appreciative of the weaknesses of Western developed professional and technical effectivenesss in an entirely different setting...." (Executive Director, Philippine-American Educational Foundation)

SINGAPORE

"...Business administration...is the most popular field of study for Singapore students going to the U.S., and engineering the second most popular...Hotel management and travel industry management are also important fields...Singaporean students with degrees from accredited American universities and colleges usually do not have any difficulty in finding suitable employment...If the degrees are in professional fields, they must be from institutions with national professional accreditation. ...American multi-national corporations in Singapore... prefer American university graduates. The Government of Singapore

SINGAPORE (cont.)

and some local corporations would prefer graduates from the Singapore universities with graduate degrees from American universities, unless they are in fields which are not offered locally."

(Recently many Singapore students have received I-20 forms too late to finalize visa-application arrangements.) "To avoid this problem, could American institutions indicate on the Form I-20 the late registration deadline as well as the regular reporting date?" (Cultural Affairs Officer)

SYRIA

"...Important fields are Agricultural Economics, Field Crops, Agronomy, Beef and Cattle Raising, Cotton Growing, Ecology, Soil Sciences, Hospital Administration, Medical Technology, Public Health, Nursing, Pharmacy, Biomedical Engineering, Speech and Hearing Therapy, Health Education, Teaching the Mentally Retarded, Occupational Therapy, Social Work, Urban Planning, Computer Science, Economics, Industrial Chemistry, Diesel Mechanics and Technology, Aviation Administration, Chemical Engineering, Environmental Engineering, Industrial Engineering, Petroleum Engineering, Textile Design, Library Science, Political Science, Veterinary Medicine, Management Studies, Public and Business Administration, Teaching English as a Foreign Language. Of these, those in the fields of Agriculture, Engineering, Public Health, and English Teaching call for study and research in the U.S.....There is a great need at all post-secondary levels for...training in research methodology, and Syrian education is especially weak in all fields requiring independent research.

"...Most Syrians who study abroad concentrate on the traditionally prestigious fields of medicine and engineering. This fact, coupled with a certain exaggerated prestige attributed to the Ph.D., has hindered the development of a corps of competent middle-level technicians. ...Graduates of the better U.S. institutions are respected as much or more than the graduates of other countries. This is particularly the case in medicine...One problem U.S.-trained Syrians may encounter is a lack of infrastructure, and consequently opportunity to employ talents which..lack proper facilities for their exercise...Another difficulty they sometimes face is the rivalry and at times hostility of more numerous colleagues graduated from the USSR and Eastern European countries.

"...One way in which U.S. postsecondary institutions can serve the country's manpower-development needs more effectively by paying more attention to training Syrians in how to transmit the expertise they have acquired to their colleagues and students, how to train them in methodical research and practical application, and how to work with and encourage the development of technicians. Syria has recently founded intermediate institutes for the training of the latter...." (Cultural Affairs Officer)

TANZANIA

"...The Principal Secretary for National Education feels science and technology are the fields which should be emphasized for Tanzanians studying abroad...In the social sciences, the U.S. is considered a leader." (Cultural Affairs Officer)

THAILAND

"...Thailand is mainly an agricultural country. Therefore, manpower development...should be in this field. How the Thai can raise their standard of living, income distribution can be improved, the young generation can be healthy and clever, are likely to call for study in the United States. ...Some Thai students who went to study in the U.S. cannot handle their positions. Most of the studies in the U.S have theoretical biases. When some Thai students return ...they cannot apply these theories to Thai traditional working conditions...Their strengths are confidence in working: they dare to talk, to discuss, to express their ideas and to stand up for their ideas in any work situation and/or social group.

"The ways U.S. colleges and universities can serve Thailand's manpower-development needs more effectively are: Curricula... in agriculture; studies should be more practical than theoretical; group discipline should be included in any course of study; Thai students should be made to work as hard as their U.S. counterparts, they should not be given degrees so easily; the host-family program is good and should continue; there should be practical training after graduation." (USAID)

URUGUAY

"...The general fields...are science and technology, more specifically in electronics, chemical engineering, electrical mechanics, microbiology, pharmaceutics, computers, animal nutrition, developmental economy, micro-macro economics, hematology, virology, and organic and inorganic chemistry....Uruguayan employers with U.S.-trained/educated employees are happy with their performances. The Uruguayan sources particularly stressed the new attitude towards work and problem-solving that these employees brought back, which they characterized as being practical, persistent, and willing to experiment. On the negative side...employees frequently are OVER-specialized when they return, and have problems adapting to local conditions (limited research funds, outdated machinery, old-fashioned processes and production methods that they are unfamiliar with, etc.)."

URUGUAY (cont.)

(U.S. institutions could serve Uruguayan development needs better in the following ways.) "Within the existing framework: a strong comprehensive orientation course is absolutely necessary for those Uruguayans going to study in the U.S....Also, more flexibility in the lengths of the study grants -- some U.S. universities only accept foreign students working in 2-4 year M.A. and Ph.D. programs. Shorter (even if intensive) grants and programs are needed for students/employees/professionals who do not have that much time... New programs: the Uruguayans interviewed indicated great interest in developing courses of study suited for MIDDLE-LEVEL technicians and professionals, rather than for specialists....U.S. education in all phases of the curing and dyeing of leathers, the textile and chemical industries, mechanics, and dyes and stamping, combined with practical experience in U.S. factories, would be useful. There was also interest expressed in mid-level business management and administrative courses, educational reform (as it could be applied to Uruguay) programs, and automobile parts manufacturing technology. ...Because of the brain drain the past decade, the Uruguayan government has taken measures to insure that those students/employees/professionals who study abroad RETURN...It is of utmost importance that U.S. professors and U.S. educational institutions realize the need to have foreign students return to their home country. U.S. professors were also criticized for taking such personal interest in their students that not only did they encourage them to stay on in the States, but also to work towards degrees which would be useless in Uruguay." (Summary Report from Assistant Cultural Affairs Officer, based on consultation with a number of both Uruguayan and U.S. sources in Uruguay.)

VENEZUELA

"Taking as a basis the priorities...for the Venezuelan Government Scholarship Program 'Gran Mariscal de Ayacucho', Venezuela's manpower needs are in: Iron and Steel, Petroleum, Fisheries, Agriculture, Naval Industry, Aeronautics, Business (graduate level), Education (graduate level). Comments from a composite of Embassy and Venezuelan sources also identified the following: Management studies in all areas (especially business administration); engineering in all fields, especially petroleum and mining, teacher training at all levels, computer sciences, natural sciences (resource and environmental management, biological sciences)...Among the small sample polled all (employers) agreed that Venezuelans who had studied in the U.S. were among the best qualified persons in the manpower pool. As regards...

VENEZUELA (cont.)

weaknesses, the majority...had no specific complaints. One source... referred to...the danger of the highly trained Ph.D. engrossed in sophisticated research not applicable to the country's needs. In addition, comments of a general nature that have come to the Embassy Cultural Office are that graduate programs in business administration prepare students for careers with multinationals and are not geared to small and medium-sized business...Ways U.S. postsecondary institutions could serve manpower development needs are: (1) The establishment of more cooperative efforts between U.S. and Venezuelan institutions; (2) Programs of study in Administration and Curriculum Planning for Technical Schools and programs of study in Public Policy and Energy Administration; (3) More in-depth orientation programs for new Venezuelan students." (Cultural Affairs Officer)

ZAIRE

"...1. The most critical fields of study involve management training, particularly in technical operations. Those programs in which American universities emphasize field work are of the most practical value. Graduates of programs in environmental planning, public administration, and even engineering regularly find themselves thrust into positions of managerial responsibility...It is consequently essential that practical experience be provided in all theoretical disciplines, especially in light of American leadership in teaching innovative problem-solving techniques....2. Again, in general Zairians view their American-trained colleagues as more practically oriented than most...A less favorable view is held of graduates in strictly academic fields, where the predominant European bias of the Zairian educational system often requires that American graduates 'prove' themselves. An ancillary problem is that Zairians studying in the States often come back with no better French language skills than when they left, and the usual expectation that studying abroad confers an entree into the world of francophone intellectuals is inevitably confounded. Nonetheless, in technical fields - e.g. fiscal management, economics, health sciences -- American-trained graduates are highly prized. 3...It would be useful if more university-to-university ties could be developed to establish joint problem-solving research activities, and to develop academic programs conferring joint, and therefore mutually acceptable, degrees. Such cooperative ventures would also allow some -- if not most -- of a student's academic work to be completed in his own country, and would also provide a vehicle for significant, ongoing educational and cultural exchange. It would also encourage more focused curricula..." (Acting Cultural Affairs Officer)

SURVEY OF DEVELOPING-COUNTRY EMBASSIES IN THE UNITED STATES

Diplomatic representatives of the same 66 countries included in the survey of U.S. posts abroad (see Appendix A) were asked to comment on the effectiveness of U.S. higher education in preparing graduates to meet home-country needs and to identify the fields they considered most important for national development. Substantive replies were received from 16 countries.

Specifically, they were asked these three questions:

(1) Which fields of postsecondary study are considered most important to your country's manpower-development objectives for the next decade? Of these, which are most likely to call for study or research in the United States?

(2) Insofar as you can generalize, what do public and private employers in your country think of U.S.-trained employees? What are considered to be their main strengths and weaknesses? Can you give some specific examples, or direct us to other possible sources of informed opinion?

(3) In what ways could U.S. postsecondary institutions serve your country's manpower-development needs more effectively?

The responses are reported country by country rather than question by question. However, key fields identified should be of particular interest as such to U.S. colleges and universities, especially in relation to what LDC students are actually studying (see panel reports, Chapter III) and what U.S. representatives abroad perceive as the needs (see preceding survey). These returns are neither large enough nor precise enough to permit the attachment of strong statistical significance. Nevertheless, they represent the voice of experience combined with authority.

1. Fields of Study

The fields cited as most important for development, and the number of respondents citing them are:

Engineering and engineering technology: 11
Health care professions: 11
Business and Management: 8
Teacher education: 5 (fields specified were adult, agricultural, arts, mathematics, music, science and vocational education)
Science: 4
Economics: 3
Social Sciences: 2
Agriculture: 8

The arts, humanities, public administration, veterinary science, and forestry were mentioned once each.

2. Excerpts from comments from individual country representatives.

BAHRAIN

"The Bahrain needs are in the following fields: (1) medicine, the auxiliary sciences, and hospital administration; (2) civil and electrical engineering; (3) training teachers in science, math, music, and the arts. With regard to Bahraini students who graduate from U.S. universities, they have (a) self-confidence, (b) independence, (c) the ability to resolve problems; (d) the desire to vary and expand their experience, (e) ability to research and draw conclusions, and (f) lack of specific knowledge in their field of study, especially at the level of B.A. and B.S. degrees."

BENIN

"The present policy of my country has an objective of providing adequate postsecondary education to our students,...so the ones actually in the U.S.A. and cosponsored by the Government of Benin are all graduate students, and they are enrolled in various scientific disciplines....As to the efficiency of those educated in the American institutions, I strongly believe that they learned enough to enhance their capacity of serving within the framework of the needs of the People's Republic of Benin."

BOLIVIA

"The fields of postsecondary study which, according to the goals fixed by Bolivia's Five-Year Plan for Economic and Social Development, have been established for the period 1976-1980, are concentrated in the sectors of agriculture and animal husbandry, industry, and services. In general terms, the response to U.S. personnel training is positive. As for the disadvantages of professional training in that country, it is difficult to generalize. As for how U.S. colleges and universities can serve Bolivia's human-resource needs, they can concentrate training in the professional and technical fields cited,...and provide financial assistance..."

EL SALVADOR

"The fields of postsecondary studies that are considered most important are (a) technological, with emphasis in the agricultural fields, industrial development, and administration, and (b) social sciences, with emphasis on human development. All of these fields would require study and research to be done in the United States. However, it is necessary that some of the research be directed to or carried out under the prevailing conditions in our country and around our own cultural patterns. In general, all U.S.-trained

EL SALVADOR (cont.)

persons are very well regarded by public and private employers. Where they may be technically strong, their main weakness is the lack of ambientation of their training to the areas or regions where they will have to work...."

GUYANA

"...We have need for trained persons in the fields of medicine, dentistry, veterinary medicine, agriculture, aircraft maintenance technology, and accountancy....Our immediate need is to have students trained in the medical and agricultural fields in order to improve and maintain a proper health programme and to develop our agricultural industry....It must be stressed that there is a need for a greater number of places to be made available to us in medical schools. There are many brilliant Guyanese who are anxious to pursue studies in this ever-important field..."

INDIA
(Summary of interview with Dr. Inam Rahman, Minister, Science and Education, Embassy of India, by session Chairman Richard B. Myer)

In general, higher education in India offers quite adequate undergraduate degrees. Graduate level education is also good in the humanities and social sciences, while medical education might even be rated excellent. The significant limitation is in engineering and technology for which there are good facilities, but there are not enough of them to meet the rapidly growing demand.

To take advantage of U.S. educational opportunities, however, is far too costly for most Indians. In India, education at all levels is heavily subsidized by central and state governments, and tuition fees are low.

The subjects which are of most importance for Indians to pursue abroad include all subdivisions of engineering, business administration and economics.

Those who have studied abroad are not discriminated against in the race for coveted government positions, but they may lack required knowlege of Indian history and languages. If so, the returnee will simply have to do some extra study to pass the qualifying exams.

What gives the returnee more difficulty is the higher expectation he carries with him - or her - from a successful sojourn abroad. Expecting to become immediately professors or persons of some equal status in government offices, they are disappointed when they must start at a more lowly post, and locals who did not study abroad are resentful that the returnee should expect so large a reward. The Indian system is hierarchical and one generally begins at or near the bottom. There are, of course, exceptions to this general rule, and their number is on the increase.

INDIA (cont.)

Indian employers do accept U.S. trained students and seem to find them more acceptable today than formerly - in part, no doubt, because there are now more openings for those trained in advanced science and engineering fields. The improving job situation is also attributable to the fact that students headed overseas are getting better advice on what and where to study before they go. The critical factor probably is, however, that there are now industries in the country which simply didn't exist 20 or 30 years ago. They offer opportunities in fields that were totally irrelevant heretofore. Electronics and space technology are two examples of this evolution. Degree holders in these fields were pretty much unemployable 25 years ago; today India has space projects and much going on in electronics which creates a demand for many of those with related degrees.

With respect to returnees in business administration, most of them are absorbed in the private sector. The government, however, is becoming more sophisticated about the management of government-owned and run industry and is therefore seeking ever larger numbers of well trained business managers.

Agricultural specialists are also experiencing a greater demand for their service. In 1977, a selection team from India visited the U.S. and picked 30 Indian students for senior level jobs at home. The teams returned in 1978 and had an equally successful recruitment. The team's search has been limited to those in graduate programs, however, which should signal Indian undergraduates interested in agriculture to do their first degree in the field at home.

One important improvement that U.S. education could make on behalf of Indian students, and others from abroad, is to enable them - and, perhaps, encourage them - to conduct research projects that are relevant to India. This means, of course, that the students have the obligation of doing some homework on Indian needs and problems ahead of time. It also means educating the educators to a greater awareness of the problems and conditions abroad on which their foreign students should be concentrating their research. This is a serious problem and one that requires prompt action by all of those involved.

INDONESIA

(1) Of urgency to our country's manpower-development objectives for the next decade are Ph.D. courses as a sound foundation for the development of university faculty and staff members in the fields of education, engineering, medicine, agriculture, etc. (2) U.S.-trained employees are in great demand by public as well as private employers in Indonesia. What we consider to be their main strength is their ability and familiarity with international dialogues. Their weakness is their present inability to keep themselves constantly abreast of the latest developments in their respective disciplines and techniques.

INDONESIA (cont.)

(3) U.S. postsecondary institutions could serve Indonesia's manpower-development needs more effectively by offering joint cooperation in academic affairs and research."

IRAN

(Note: This was prepared before the Iranian revolution. Educational priorities, like others, are subject to possibly radical change.)

"...in terms of study fields, (survey) results revealed that among the (29,574 Iranian) students (in the United States in 1976-77), there were over 41 per cent in various engineering specialties, 5 per cent in technology, and 3 per cent in architecture, almost 11 per cent in business skills and management, with 4 per cent in computer science and the Physical Sciences, more than 3 per cent in the biological; over 2 per cent each in education and the social sciences (exclusive of economics); approximately 7 per cent reported enrollment in other fields, and almost 14 per cent were undecided."

JAMAICA

"(1) The fields of postsecondary education that I consider most important to my country's manpower-development objectives for the next decade are (a) broad-based training in agricultural sciences together with the ability to disseminate agricultural education among the farming population...in courses leading to a diploma in agriculture in technical colleges and schools of agriculture; (b) To be able to train sufficient medical personnel to be self-sufficient in our hospitals, dispensaries, clinics, and schools; (c) To obtain a wide-based first-degree education in science and arts subjects. Generally, public and private employers in my country think that U.S.-trained employees are very good. However,...European-trained doctors, engineers, and dentists seem to be able to adapt their skills to various aspects of their professions and fields, while the U.S.-trained counterpart usually finds it difficult to operate in a non-specialized way. U.S. postsecondary institutions could serve my country's manpower-development needs more effectively by liaising with our Ministry of Education and with the University of the West Indies who could make sure that students are directed to...institutions in the United States which give broad-based curriculum from which the Jamaican student could choose courses which are applicable to the agrarian structure of Jamaica and its need to have technical industrial knowledge in its growing industries. These fields would include chemical engineering, hydro-electrical engineering, civil engineering, broad-based medical education, dental education, agricultural education, and broad-based telecommunications education to bring knowledge to the country as a whole inexpensively and efficiently."

JORDAN

"...Technical and professional education are given high priority in Jordan's educational needs. Graduates of U.S. universities and institutions, especially in technical and scientific fields, are held in high esteem in Jordan."

PHILIPPINES

"(1) Fields of postsecondary study considered most important to the Philippines' manpower-development objectives: public administration, vocational education, natural sciences, agribusiness, all areas of engineering, management, public health systems, and economics. Fields of postsecondary study most likely to call for study or research in the United States: public administration, public health systems, vocational education, agribusiness, and engineering. (2) Employers' estimation of United States trained employees: High regard as well as high expectations. Strengths: Broader exposure to an understanding of knowledge and practice within area of specialization. Weaknesses: Tendency to be somewhat alienated from native cultural mainstream, and consequently, lack of a firm grasp of the real world of the home country, resulting in vulnerability to temptations to emigrate (brain drain). (3) Ways United States postsecondary education may serve the developing countries' needs more effectively: principally by their acquiring some knowledge and understanding of how various fields of study may be affected by differing priorities and values within other cultures as well as by the existential conditions in developing countries."

SAUDI ARABIA
(Excerpted from a longer paper, "Development of the Saudi Human Capital," prepared on behalf of Dr. Reda Kabli, Educational Attache, Saudi Arabian Education Mission, Houston, Texas, by Dr. Talal K. Hafiz.)

"...The U.S. higher educational system is flexible and able to respond to the urgent needs of the ambitious Saudi development goals. Hundreds of Saudi students graduate every year and return to the Kingdom to begin work, whether in the private or the public sector. According to the Atlantic Monthly magazine, the Saudi cabinet has more American trained Ph.D.'s than the U.S. Cabinet (February, 1978, issue, page 43).... Educators and planners are becoming more sensitive to the complexity of foreign student education and its impact on traditional cultures. Scholarship tends to accept that educational testing should be related to the country's own cultural background, including its own religion, government, and existing human and natural resources. One does not need to ignore educational testing, but Saudi students, like any other foreign students, need to be given the chance to perform academically. They should not be denied acceptance for Master's or doctoral programs because their GRE score is not high enough..."

SIERRA LEONE

"...I would say that the fields of postsecondary study considered most important to my country's manpower development objectives are: veterinary science, quantity surveying, accountancy, business studies, pharmacy, medicine, dentistry, forestry, development planning, statistics, public health, printing, engineering (electrical), estate management, agriculture, agricultural education, education, adult education. The fields which are most likely to call for study in the United States are public health, development planning, agricultural economics, education, engineering, dentistry, architecture, banking, insurance, agricultural education, personnel management..."

TANZANIA

"...The fields of postsecondary study considered most important to our country's manpower-development objectives are: All sorts of agricultural education; all sorts of engineering; medical sciences and public health, economics and business administration...I might point out that the United States has not been so generous as to allow foreign students to study in its medical schools. Medical schools have almost closed their doors to foreign students. This, plus the exorbitant costs charged by medical schools, makes it impossible for students from Tanzania to study there....My impression of U.S.-trained employees is that they are good and competent... However, the employers would be in a better position to judge individual strengths and weaknesses....

"The postsecondary institutions could serve my country' manpower development more effectively if they would give them a chance to have practical experience. For example, we have two students, one with a B.S. in mechanical engineering and the other with an M.S. in chemical engineering. They have tried to find practical experience jobs during summers, but no firm has been willing to give them a chance. Under such circumstances, these students can hardly have a technology transfer knowledge. When they go home, they will seem more ignorant in their fields than those who have studied in the same fields at the University of Dar es Salaam, for there they get both theory and practice at the same time. Yet these students, having studied in the most technologically advanced nation in the world, will have the theory but not the practice!...The U.S. should provide a chance for foreign students, during the summer, to get experience in their fields. The students are not necessarily interested in the money...but they are indeed interested in the transfer of technology. A country like Tanzania needs practical knowledge and experience in solving its problems...."

TUNISIA

"...we are presently exploring the different ways to give our students the opportunity to study in American universities, and thus benefit more efficiently from U.S. technology. In this regard I feel that technical fields, such as engineering, will be most important to my country's manpower-development objectives for the next years. In view of the small number of Tunisian students having pursued their higher education (in the United States), I cannot yet generalize as to the opinions of employers of U.S.-trained employees. We would appreciate, however,...help with the placement of our students in American universities and with suggestions as to the ways for them to obtain financial assistance."

VENEZUELA

(The following is a summary of a discussion between Richard B. Myer, chairman of the session on U.S. curricula, and Dr. Gonzalo Palacios, First Secretary, Embassy of Venezuela.)

The prime objective of higher education, for both domestic and foreign students is the formation of the total individual, one able to make informed judgments about the needs of the whole society as well as those peculiar to economic development.

To accomplish this aim, U.S. education should take steps to expand its awareness of the larger world and the many cultures from which its foreign student have come. Too much of what is offered as education today is simply specialization on some practical technique. Such concentration lacks a vision of the individual and the global perspective one requires to contribute intelligently to development.

This shortcoming is especially inimical in its influence on undergraduates. Those older and more advanced are, in principle, at least, ready for professional studies related to some occupation. The undergraduate, on the other hand, is still too young to understand the needs of the job market and, if he is from Venezuela, for instance, his U.S. professors are probably equally ignorant of labor needs in that society and are perhaps not strongly interested, in any event. Thus, for both practical and philosophical reasons, it is premature for the undergraduate to pursue professional studies in the United States.

The young foreign student faces obstacles in his quest for a "liberal" education, however. The U.S. system is structured to emphasize work-related curricula, and it tends to channel foreign students into fields which presumably prepare them for "useful" careers at home.

But acquiring some particular knowhow is superficial. It is far more important for the student to acquire some basic "idiosyncracies" such as a potent work ethic, and a desire to grow and prosper through individual effort and achieve-

ment. The basic question for the foreign student, therefore, is whether he will carry home the true spirit of development, that is, a set of values and goals that rest squarely on the work ethic and the necessity of changing those traditional patterns at home which are antithetical to sustained and goal-directed human effort.

SURVEY OF LDC ALUMNI OF FOUR U.S. UNIVERSITIES
by Richard B. Myer

I. Introduction

In order to secure first-hand evidence of how fully former LDC students have used their U.S. education and how they now judge their overseas academic experience, the curriculum session planning group authorized a pilot survey of LDC alumni.

A fresh search for data was undertaken, because the relatively few previous studies made of foreign-student alumni have generally examined those from one school, one country, or in a narrow range of fields. The planning group thought the Conference participants would benefit more from findings based on a more representative group of LDC alumni, one that included former students in all fields, from all regions of the world, and with both undergraduate and graduate degrees.

To accomplish this, alumni records were sought from four U.S. universities: Massachusetts Institute of Technology, Northeastern University, Ohio State University, and the University of Illinois. These four were selected primarily because they had large foreign-student enrollments, represented both private and public institutions, and were well known to members of the planning group. Their alumni offices willingly provided mailing labels for all their LDC alumni plus a small number of developed-country alumni, totalling approximately 9,000. From this body, 3,900 LDC alumni who had graduated since 1950 and were currently resident in a developing country were chosen at random, as were 275 graduates from Europe, Japan, Canada, and Australia to serve as a comparison group.

The questionnaire distributed to the alumni asked 40 questions. Most dealt with post-graduation experiences the respondents would have had in the United States or at home that might have influenced: (1) the extent to which they have been able to employ their U.S. education, (2) the value they now place on it, and (3) their perceived contribution to national economic development. These questions, referred to in survey research as independent variables, covered such subjects as the amount of counseling the students received before selecting a major field of study, whether a specific job awaited them at home, the field of study and level of degree awarded, family wealth, the problems faced in adjusting to U.S. culture and using English, and a number of specific circumstances of their post-return work experience and environment. (The complete list of independent variables used is given in an appendix to this chapter.)

Eight questions were designed to measure directly the utilization the respondents had made of their overseas education and its impact on their professional advancement and the economic development of

---

Richard B. Myer, Chairman of the Conference session on relevance of U.S. curricula to LDC needs, is a consultant on international education and a former Vice President of the Institute of International Education.

their home countries. These questions we will refer to henceforth as the dependent variables.

II. The Respondents

Six hundred and seventeen completed questionnaires had been received by the time data processing was completed in the final week of March, 1979.

Since the four participating universities have large graduate faculties and a full array of professional schools, it is not surprising that most of the respondents earned M.A. (307) and Ph.D. (207) degrees during their sojourns in the U.S. The predominance of returns from engineers, however, was unexpected, although not surprising when Open Doors, the IIE Census of Foreign Students, is examined and consideration given to the fields which have traditionally attracted LDC students to the United States. Compared with the field-of-study distribution reported in the 1977-78 Census of Foreign Students, the survey returns were light on business (10% vs. 17%) and the arts and humanities (2% vs. 10%) and relatively heavy on agriculture (8% vs. 4%), the sciences (18% vs. 14%) and engineering (43% vs. 29%). Had the survey been conducted of graduates since 1975, rather than 1950, it is reasonable to predict that there would have been somewhat fewer replies from engineers and more from business students. On the other hand, there is some evidence that Ph.D.-granting institutions, including the four whose alumni are in the survey, enroll larger numbers of science, engineering, and business students from abroad than do other institutions of higher education. (See "Higher Education Panels Reports," No. 40, American Council on Education, August 1978.)

The other unexpected character of the returns was their distribution by world region. Nearly half (46%, n-281) were from Latin America; the returns from other regions of the world were as follows:

World Region	Percentage	Number
East Asia	14	85
South Asia	14	84
Africa	8	52
Developed	7	41
Far East	5	36
Mid-East	7	52

The Foreign Student Census figures for 1976-77 indicate that 24% of LDC students in that academic year were from Latin America. Initial reaction to the regional imbalance in survey returns was a speculative

assumption that Latin Americans may have been relatively more numerous among foreign students in earlier years. A subsequent inspection of the census records back to 1950 bear out this assumption. That is, Latin Americans made up 38% and 43% of the LDC student totals in 1950-51 and 1953-54, respectively, and have slowly declined as a proportion of the total foreign student population.

While it is evident that the survey returns favor Latin Americans slightly and clearly overrepresent engineers, it is not so evident at this stage of the analysis what bias, if any, this may have given to the replies of the respondents. This question remains to be explored more fully.

When classified by the income level of the country from which they originated, the returns are fairly well distributed. That is, there are 154 low-income countries, 189 from lower-middle groups, 232 from upper-middle groups and 41 from the upper or developed group--using data appearing in the Overseas Development Council publication, Agenda for Action 1977, as a basis for classification.

Noted below are some additional characteristics of those who completed the questionnaire:

1. 92% are males (n-566)

2. 11% are under 30 years of age; 44% are 30-39; 31% are 40-49; and 13% are 50 or over

3. 4% claim to be offspring of wealthy families, 42% of well-off families, 45% of moderate income familes and 9% of low or inadequate income familes

4. 59% are Ohio State and University of Illinois alumni, 31% are MIT alumni and 3% are former students at Northeastern

5. 25% regularly maintain association with professional colleagues in the U.S.; 55% do so occasionally and 21% do not do so at all.

III. The Survey Findings

A. How They Responded

In this section of the report, responses to the individual questions will be examined: first, those that relate to independent variables, then those containing the dependant variables.

1. Independent Variables

a. The Pre-Sojourn Situation

The questions which are intended to help us understand why alumni did or did not make good use of their education--that

is, the independent variable questions--can be divided into five groups: (1) the personal characteristics or the respondents (age, sex, and family background), (2) experiences preceding their sojourns in the United States, (3) experiences of the sojourns, (4) post-sojourn experiences and circumstances external to the respondents' workplace, and (5) experiences within the workplace.

Four questions sought to tell us something about pre-departure preparation. Their scores are summarized below:

(1) 14% and 38% of the alumni had a great deal or some counseling on education in the United States before leaving home. Roughly half, therefore, had little or none.

(2) 86% had a definite or very definite idea about the career they expected to follow, and only 10% changed their plans after beginning their U.S. education.

(3) 64% claimed that a job awaited them on return to their home country.

b. Sojourn in the United States

While attending one of the four U.S. universities in the sample, the alumni reported having had the following experiences:

(1) 57% were given a great deal or some on-campus academic counseling. It is striking, perhaps, how many received little or none at all.

(2) U.S. institutions financially supported 38% of these alumni, 23% were primarily dependent on family help, 24% on home country institutions, 6% on international institutions, and 9% on other resources.

(3) Only 35% reported having had some or a great deal of difficulty with English (32% and 3%, respectively). The same percentage reported having had problems adjusting to aspects of U.S. culture--32% to some aspects, 3% to many and .2% to most.

(4) As noted above, the respondents were concentrated in engineering, the sciences and business. Their complete distribution by field is as follows:

Field of Study	Percentage
Arts and Philosophy	2.3
Social Sciences	5.6
Economics	3.6
Applied Sciences	4.6

Field of Study	Percentage
Pure Science	12.4
Engineering	42.8
Business	10.2
Medical	2.3
Education	7.8
Agriculture	8.3

(5) Some form of thesis research was conducted by 79% (n-489). Of these 49% (n-243) said that it related to home country problems, and 27% of the latter (n-83) actually conducted their thesis research at home.

(6) The most frequently reported lengths of stay in the U.S. were two years (26%) and over five years (27%). The remainder was divided evenly among one, three, or four years (i.e., about 15% in each).

(7) Half of the group received the M.A. degree while in the U.S., 34% the Ph.D., 9% the B.A./B.S., and 7% some other form of certification.

(8) Sometime during the sojourn, 43% of the respondents had in excess of one month of practical training off campus. Specifically, 21% reported more than six months, 8% three to six months, and 14% one to three months.

c. The Post-Return Situation

The questionnaire contains several items which dealth with the individual's experiences and circumstances, outside of his or her particular workplace, following departure from the United States.

(1) With regard to the length of time which had passed since alumni had left the U.S, 38% had departed over 10 years ago, 26% between five and 10 years ago, 25% between two and five years ago, and 12% less than two years ago.

(2) Thirty-three per cent have held but one job since leaving the U.S., 30% two jobs, 15% three jobs, 9% four jobs, and 13% five or more.

(3) Seventy-six per cent are currently living in capital or major cities, 18% in regional cities and 7% in small towns.

(4) A regularized association with professional acquaintances in the United States is maintained by a quarter of the respondents. Fully half maintain some ties with former professional colleagues and professors, and only 20% report no U.S. professional associations.

(5) The rather active professional ties abroad noted above many be related to the high regard in which U.S. education is held in the home countries of most of the alumni group. Eighty-one per cent reported that this was the case. Only 1% indicated that they thought it was not well regarded.

(6) The respondents are distributed by region of the world as follows:

World Region	Percentage
Mid-East	6.7
Africa	8.5
East Asia	13.8
Latin America	45.7
Far East	5.0
South Asia	13.7
Developed Countries	6.7

(7) By level of national per capita income, 25% of the alumni are found in low-income countries, 31% in lower-middle-income countries, 38% in upper-middle-income countries, and 7% in developed upper-income countries.

(8) A determination was made of their distribution according to the growth rates of their home countries but will not be shown, since it proved to have no bearing on the dependent variables.

d. Working Conditions and Experiences

In the last category of independent variables are those that describe some feature of the alumni's workplace at home.

(1) Thirty-eight per cent have been employed at their current place of work for five years or more, 24% for three to four years, and the remainder for less than three years.

(2) They are employed in a great variety of fields and institutions, with the largest proportion in education.

Fields	Institutions
Education - 38%	Education - 39%
Government administration - 8%	Central government office - 10%
Agriculture - 8%	Local government office - 2%
Transport - 2%	Government organization - 14%
Communications - 1%	Private local firm - 15%
Manufacturing and mining - 13%	Foreign owned firm - 7%
Construction - 8%	Own firm - 12%
Medical - 2%	Other - 1%
Trade - 3%	
Retail - 12%	
Service - 4%	
Banking - 3%	
Other - 11%	

(3) Three questions tested the psychological environment of the workplace in relation to the use alumni made of their U.S. education. The first asked whether respondents have been encouraged to use their overseas education. Fifty per cent reported that they were warmly encouraged; 39% were moderately encouraged; and only 5% indicated that supervisors were in any way discouraging.

A second question asked whether coworkers sought new ideas. Fifty per cent claimed that they did so constantly, and 40% claimed that this happened occasionally. Only 2% find their coworkers opposed to change.

A third related question asked whether respondents were expected to find better ways of doing things. Sixty-two per cent answered that they were to a great extent, and 30% claimed that they were to some extent. Only 2% appeared to have experienced no expectation of this kind.

(4) When asked how many had coworkers who had studied in the United States or other industrialized countries, 20% indicated that most of them had done so, 31% that some had, 32% but a few, and 16% that none had. (The reader is urged to note this paragraph well, for the independent variable described here proved to be extremely significant.)

(5) The relative level of the respondents' influence on the job was tested by asking them how much policy authority they had and how many persons they supervised. Forty-two per cent claimed a great deal of authority, 34% some, and the rest little or none. Sixty-six per cent supervised a large number or quite a few, and the rest a small number or none.

(6) In the belief that the relative wealth of the employing institution might be important, respondents were asked to report on the resources of their employers. Twenty-six per cent replied that they were ample, 46% just enough, and 26% inadequate.

2. Dependent Variables

The eight questions considered to be measures of dependent variables were subjected to factor analysis which established that at least three separate factors were present, each combining two of the eight questions. The resulting three indices, i.e., the joining of two or more questions into a single variable, represent the major dependent variables. The other two questions appear to be of secondary importance.

a. Utilization of Education

The two questions which constitute this key dependent-variable index asked: (1) whether the alumni's current positions are related to the fields in which they took their U.S. degrees and (2) how much of their education abroad they are using professionally. Answers to the former disclosed that 69% fill positions that are clearly related, 27% somewhat related, and 4% not at all related. Regarding the latter, i.e., professional use, 21% reported almost full use, 48% much use, 26% some use, 3% little use, and 2% practically none.

When the responses to the two questions are combined into an index of use the scores are distributed as follows:

Index of Use

Most	43%
Some	30
Least	27
	100%

b. Education Abroad and Development

The two questions bearing on the issue of development asked: (1) how important a role respondents' places of employment play in national development and (2) to what extent their current positions enable them to contribute to national development. Fifty-four per cent reported that their employing institutions were very important sources of such development; 37% and 9%, respective, consider them to

be moderately important and unrelated. Concerning their own contribution, 39% see it as being significant, 50% as moderately important, and 11% as unimportant.

The index of development, a summary of these two questions, produces the following scores:

Development Index

Most	33%
Some	25
Least	42
	100%

c. Career Development

Two closely associated questions might be said to measure the degree to which the alumni believe their U.S. education provided them with professional grounding for a career. One asked quite specifically for a judgment on how well their U.S. education prepared them for a career. The other asked whether they would alter their curricula if they were now to commence studies in the U.S.

Replies to the first revealed that 61% rated the preparation excellent, 32% good, 6% moderately useful, and .3% poor. If they were now to commence their studies in the U.S., the gist of the second question, 64% would follow the same program and 36% would make some changes in the original curricula.

The career index scores are as follows:

Career Index

Most positive	46%
Somewhat positive	32
Least positive	22
	100%

d. Knowledge Transfer

A single survey question was addressed to the issue of how much of their learning alumni have shared with others at home.1/ Forty per cent of the respondents maintained that they

1/ This question was inspired by several U.S.A.I.D. studies of participant trainee returnees which treated this question in considerable detail. See A.I.D. Participant Training Program: An Evaluation Study Global Analysis, U.S. Department of State, Washington, D.C., 1966, pp. 187 ff..

had communicated a great deal to others, 48% reported some, 10% a little, and 2% practically none.

B. What Influences the Outcome of U.S. Education

In this section of the report, relations between the independent variables and the dependent variable indices will be explored to show which of the former seem to have had significant influence on the latter and which did not. The reader should proceed with caution, for the terrain is largely uncharted and is undoubtedly speckled with pitfalls. That is to say, readers should recall that the sample employed here is relatively small. It represents, at best, the alumni of Ph.D.-granting institutions and falls short of doing this to the extent that it may contain an excess of engineers and Latin Americans. They should also be aware that juggling this many variables at one time is very likely to cause a statistical mishap or two, particularly since not all of the variables are the kind that lend themselves indisputably to manipulation by the more powerful statistical techniques. Despite these more obvious shortcomings, it should still be possible to make some fairly secure judgments about the extent of association between the two sets of variables. 2/

2/ While an extended recitation of survey omissions and methodological shortcomings would undoubtedly tax the readers' patience, they should be aware of several issues not raised in the questionnaire which may be influential in determining how and how well alumni use their U.S. education:

1. The level and quality of schooling completed by alumni before leaving for the United States and the quality of academic performance in the United States.

2. Whether the fields in which alumni majored in the United States corresponded to important national development needs or, correlatively, what level of demand they found on return home for persons trained in their fields.

3. The returns on the educational investment made by the alumni, a subject of considerable interest to educators and development economists.

4. The effect of the overseas experience on alumni attitudes toward work and socio-economic change.

1. Utilization of U.S. Education

a. The Pre-Sojourn

As described in Section A,1,a. above, four independent variables covered this period of the respondents' experience. Of these, only one seems to make any difference in the ultimate use made by the alumni of their U.S. education: that is, the degree of counseling received before departure from home. If the influence were stated in a percentage, predeparture counseling might carry a weight of about 1%. 3/

b. The Sojourn in the United States

While studying in the United States, alumni nade a number of decisions and had a variety of experiences which might have influenced the subsequent use of their education. Ten such independent variables were included in the survey, viz., field of study, degree taken, source of funds, research opportunities, counseling and others - see A,1,b. above.

From among this complex multitude, the degree level is a notably significant influence, while field of study, source of funds, and counseling are minor determinants of use. Table 1 relates the index of use and academic degree.

TABLE 1: RELATIONSHIP BETWEEN INDEX OF USE AND LEVEL OF DEGREE EARNED BY ALUMNI

	Degree Earned			
Use	BA/BS	MA/MS	PhD	Other
Most	23%	33%	65%	33%
Some	25	33	26	41
Least	52	34	9	26
	100% (56)	100% (304)	100% (207)	100% (42)

Whereas earners of the M.A. are distributed quite evenly among the three use categories, the Ph.D. and B.A. holders show marked differences, the former with 65% in the most category and the latter with only 23% there. Statistical analysis suggest that degree level may influence use to the extent of 8-9%.

Field of study infouence is less clear because of the multiplicity of fields involved in the somewhat smaller differences. Nonetheless, they are apparent, as Table 2 reveals.

3/ For those interested in the specific sources of this figure, it was derived from regression analysis which produced an RSqChange for this variable of .010 and a simple R of .104.

TABLE 2: RELATIONSHIP BETWEEN INDEX OF USE AND FIELD OF STUDY

	Field of Study							
Use	Soc. Sc.	Eco.	Applied Science	Pure Sc.	Eng.	Bus.	Educ.	Ag
Most	41%	50%	25%	63%	33%	39%	55%	64%
Some	32	23	54	25	31	28	32	18
Least	27	27	21	12	35	33	13	18
	100% (34)	100% (22)	100% (28)	100% (75)	100% (256)	100% (61)	100% (47)	100% (50)

It seems evident that engineering, business, and applied science students from this alumni group are making less use of their U.S. education than are those schooled in education, agriculture, and the pure sciences. When possible distortions of this relationship are taken into account, distortions such as length of time back home, degree level, and others, the resulting influence on use by field of study is something on the order of 2%.

A roughly similar influence may be attributed to the foreign students' source of funding. That is, there is a considerable difference in level of use between the individual who was institutionally supported during his stay abroad and one who was not. Twenty-two per cent of the latter reported the most use; approximately 50% of the former reported the same.

Campus counseling of the alumni group also proved to be moderately influential in respect to subsequent use of the U.S. experience. Fifty-two per cent of those who received a great deal of counseling were in the "most" category of use; 33% of those who received none were also recorded as most-users. The overall influence of counseling may be 2-3%.

As for the variables at work in the sojourn which had little or no influence on use, they include such seemingly important factors as level of English language comprehension, cultural adjustment problems, and the amount of off-campus practical experience. This does not mean that these factors were not important for some students, but, in the aggregate, they appear not to have appreciably influenced the extent to which alumni used their education.

Whether they conducted a piece of research and whether this research was done on a home-country problem or carried out at home are also factors which were of little or no consequence for this particular alumni group.

c. The Post-Return Situation

The general environment of the respondents, which was covered by some eight variables, has had seemingly little to do

with how much use they made of their education. The single exception to that generality is the variable for world region, as Table 3 indicates.

TABLE 3: RELATIONSHIP BETWEEN INDEX OF USE AND WORLD REGION OF ALUMNI

	World Region						
Use	Mideast	Africa	E. Asia	L. Amer.	Far East	S. Asia	Developed
Most	63%	63%	48%	34%	45%	50%	34%
Some	14	29	28	33	36	26	37
Least	22	8	24	33	19	24	29
	100%	100%	100%	100%	100%	100%	100%
	(41)	(52)	(85)	(275)	(31)	(84)	(41)

While Africans and Middle Easterners among this alumni group appear to have made more use of their U.S. degrees than have alumni from Latin America and the developed countries, when this relationship is controlled for other possible influences, especially the number of co-workers with U.S. and European education, the African and Middle East advantage shrinks to the point where regional origins of the alumni may count for no more than 1-2% of the overall determinant of use.

Such factors as how long ago the respondents left the United States, how many jobs they have held since, the location of their current workplace and how highly regarded the U.S. degree is at home have had little or no bearing on degree of education use by this alumni group.

d. Working Conditions and Experiences

Of the seven independent variables that define specific aspects of workplace conditions, three contributed measurably to the level of use: the type of employing institution, the extent of encouragement given the returnees by co-workers and supervisors, and the number of co-workers with overseas education. The first of these, with an influence level of approximately 2-3%, suggests that alumni working in education and government offices are more likely to use their education. Table 4 gives the relevant details.

TABLE 4: RELATIONSHIP BETWEEN INDEX OF USE AND CURRENT PLACE OF EMPLOYMENT

	Place of Employment						
Use	Central govt.	Local govt.	Educa. inst.	Govt. organ.	Private firm	Foreign firm	Own firm
Most	48%	(40)	63%	43%	18%	18%	22%
Some	33	(10)	25	40	32	36	28
Least	19	(50)	13	17	50	46	50
	100%	(100)	100%	100%	100%	100%	100%
	(63)	(10)	(240)	(83)	(94)	(44)	(74)

The apparent differences between, say, education and government organizations, on the one hand, and business firms of all three types, on the other, are less a consequence of inherent institutional features than the fact that the institutions with higher use levels are also those with more Ph.D.'s and, what is far more significant, larger coteries of people with U.S. education. It is for that reason that the influence of place of employment does not exceed 2-3%.

The psychological setting of the workplace, as it relates to encouragement of alumni to use their U.S. education, not surprisingly, also has exercised some influence over the degree to which they reported such use. The combined influence of these three survey questions (see III,A,1,d,(3) above is 2-3%.

The last of the three work-condition variables is stunningly potent in its influence. It asks, specifically, how many co-workers have studied in the U.S. or other industrialized countries. With a remarkable correlation coefficient of .839, its total influence on alumni education use is no less than 47%. The power of this variable greatly diminishes the seeming strength of such other important dependent variables as academic degree, field of study, and region. That is, when the relationship between those three and the index of use is controlled by the co-worker variable, the original relationship falls to the small percentages of influence attributed to them above. The reverse, it should be noted, is also true, namely that, unencumbered by the influence of other independent variables, the co-worker variable influence over use reaches almost 75%. When all the variables discussed in relation to education use are consolidated, and their interactions discounted, their combined influence on education use is approximately 70%--an unusually high figure for research outcomes in the social sciences. 4/ Table 5, showing the

4/The independent variables included in the survey found to have had inconsequential influence individually may have an aggregate influence on the order of 5%. Thus, all of the survey variables may count for roughly 75% of the variation in the independent variable - education use.

co-worker-index of use relationship, will help to make credible the claim made for the potency of the co-worker variable.

TABLE 5: RELATIONSHIP BETWEEN INDEX OF USE AND CO-WORKERS WHO STUDIED ABROAD

	Co-Workers			
Use	Most	Some	A Few	None
Most	98%	74%	0%	0%
Some	2	25	67	0
Least	0	1	33	100
	100% (124)	100% (190)	100% (200)	100% (97)

Table 5 demonstrates that virtually all alumni working in an office or shop where most of the co-workers are foreign educated will use most of their U.S. education. In contradistinction, those working in places where they are the only foreign educated persons invariably use the least amount of their learning.

e. Personal Characteristics - Postscript

It appears that sex, age and family wealth differences did not appreciably affect the extent of U.S. education use.

2. Development and Education Abroad

a. Pre-Sojourn

The objective in respect to this dependent variable, economic development, is to determine whether, and to what extent, any of the circumstances and experiences of the alumni have significantly affected their contribution to economic development, as measured by the development index constructed from two of the survey questions.

Examining the situations of respondents before arriving in the United States - as defined by four independent variables - we find that only one, namely, whether the respondents had a job awaiting them, materially determined their subsequent contribution to development. The impact was light, however, not much over 1%.

b. The Sojourn in the United States

Unlike the relationship between education-use and the type of academic degree held by alumni, degree type is not a determinant of contribution to development. On the other hand, both use and contribution to development are affected by the respondents' field of study. In respect to development-contribution, the influence

of field appears to be about 1%, less striking, no doubt, than Table 6 suggests; however, the table does not reflect the interacting effects of other influences yet to be described.

TABLE 6: RELATIONSHIP BETWEEN INDEX OF DEVELOPMENT AND FIELD OF STUDY

	Field of Study[5/]							
Development	Soc. Sc.	Econ.	Applied Science	Pure Sc.	Eng.	Bus.	Educa.	Ag.
Most	27%	36%	32%	37%	29%	33%	40%	50%
Some	18	27	21	21	24	21	31	30
Least	55	36	46	41	27	46	29	20
	100% (33)	99% (22)	99% (28)	99% (75)	100% (257)	100% (61)	100% (45)	100% (50)

Although the differences in Table 6 are not dramatic, it is evident that agriculture and education majors believe they are more involved in national economic development than are social scientists and even engineers and applied science people. Business majors are also among those least involved in development efforts.

On-campus academic counseling seems to have had a slightly positive affect on contribution-to-development, close to 1%, which is somewhat less than its influence on education-use.

The third variable related to the sojourn period that appears to have had enough influence to warrant attention is difficulty with the English language. Its rather weak influence probably results from the fact that 65% of the group had no trouble with English. Nonetheless, those who did experience some difficulty seem to have had somewhat less subsequent participation in national development. The over-all influence is, at best, around 1%.

c. The Post-Return Situation

Having returned home, the respondents undoubtedly underwent a multitude of experiences that may have influenced their contribution to development. Among those tested by this survey, country of origin was clearly paramount, though less influential than Table 7 would suggest it might be.

5/Art-philosophy and medicine are omitted because the numbers of cases were insufficient (12 and 14).

TABLE 7: RELATIONSHIP BETWEEN INDEX OF DEVELOPMENT AND WORLD REGION OF ALUMNI

	World Region						
Development	Mid-East	Africa	E.Asia	L.Amer.	Far East	S.Asia	Developed
Most	22%	67%	29%	33%	29%	33%	23%
Some	27	19	37	19	36	36	15
Least	51	14	34	48	36	31	62
	100% (41)	100% (52)	100% (84)	100% (277)	101% (31)	100% (83)	100% (39)

From Table 7 it can be assumed that Africans are far ahead of all others in their contribution to national development, at least in the self-evaluation of their efforts. Following at a considerable distance are the three Asian groups. The developed-country respondents, with 23% at most, are least engaged in development, which raises the question as to whether U.S. alumni would have given comparable responses. Unfortunately, no sampling of such alumni was surveyed. The general weight of region of origin on development is approximately 3%.

The only other variable influencing contribution-to-development, among those which define the post-return situation, is the degree of regard for U.S. education in the home country. Its impact is on the order of 1%.

d. Working Conditions

The nature and quality of the alumni's working conditions were the predominant influences on education-use. In the case of contribution-to-development, this category of variables is less significant, but it nevertheless counts for more than any of the others.

One of the variables in this category that was important for education-use, and seems to have been equally so for development-contribution, i.e., at the influence level of 2-3%, is the alumni's employing institution. The order of importance of these institutions is somewhat different in respect to development, however, as Table 8 indicates.

TABLE 8: RELATIONSHIP BETWEEN INDEX OF DEVELOPMENT AND CURRENT PLACE OF EMPLOYMENT

	Place of Employment						
Development	Central govt.	Local govt.	Educa.	Govt. organ.	Private firm	Foreign firm	Own firm
Most	49%	(50)	34%	42%	19%	22%	29%
Some	29	(20)	30	24	14	27	22
Least	22	(30)	36	34	67	51	49
	100%	(100)	100%	100%	100%	100%	100%
	(63)	(10)	(237)	(83)	(94)	(45)	(73)

The institutions offering the most positive setting or opportunities for development are those of governments. Alumni employed as educators divide about evenly over the three development categories, while those in private industry, especially locally owned firms, are least involved of all in the development process--that is, by their own estimation.

Another characteristic of the workplace relationship which seems to affect development participation is the degree of policy-making authority possessed by the respondents. Where they have a great deal, 46% claimed to be in the most active development category. Only 20% of those reporting no policy-making authority claimed to be in the most active development category. The aggregate impact of this factor on contribution-to-development is estimated at 3%.

The third feature of the workplace which appears to make an appreciable difference in contribution-to-development is what has been referred to as the psychological setting, i.e., the degree of encouragement to use their U.S. education given alumni by the behavior of colleagues and supervisors. Table 9 shows the very considerable variation in development-involvement produced by this independent variable.

TABLE 9: RELATIONSHIP BETWEEN INDEX OF DEVELOPMENT AND WORKPLACE ENCOURAGEMENT

Development	Encouragement		
	Most	Some	Least
Most	48%	33%	15%
Some	27	26	22
Least	25	41	63
	100%	100%	100%
	(165)	(275)	(129)

The respondents enjoying maximum encouragement are also those with the greatest proportion most actively engaged in development (48%). Those least encouraged have the smallest proportion in the most-active category of development-contribution (15%) and the largest proportion (63%) among those least involved in development. The estimated influence level of this factor is about 3%.

e. Personal Characteristics

Of the three personal characteristics included in the survey--age, sex and family wealth--two have a sufficiently strong association with the development outcome to warrant special attention.

For reasons that are not immediately evident, sex differences account for about 1% of the variation in development activity. Thirty-five per cent of males claimed to be contributing significantly; only 17% of females rated their contribution as significant. Behind this ostensive disparity, however, are some intervening circumstances which at least partially explain why these women alumni have been less active in development.

For one, they have gained far less policy-making authority in their professional lives. Forty-three per cent of the males are in high-level positions; only 25% of the females are equally well placed. When both have a great deal of authority, they participate in development at virtually the same level. It is only when women have little or no authority that their contribution to development falls behind that of men.

A quite similar pattern emerges when the sex-development relationship is controlled for on-the-job encouragement--the psychological setting. When the maximum amount of encouragement is present, women engage in significant development about as often as men. When the encouragement level falls, however, women are increasingly less likely than men to share in development. This set of findings should not lead one to conclude hastily that women are indeed the weaker sex and can perform well for development only when girdled by supports of various kinds. There are very likely to be other intervening factors that bear upon the sex differences found in this survey. Additional analysis of the data and further study may uncover some of them. 6/

6/The sex-development relationship is also controlled for type of employing institution, age, field of study, and world region. Only the factor of age among these variables helps to explain male-female differences. While the differences do not disappear when the same age groups are compared, they are diminished, the key fact being that there are relatively fewer females (35% to 45%) in the two oldest age groups which are the strongest contributors to development.

More potent an influence on development-contribution than sex differences-at the level of approximately 4%-it seems are age differences. Those respondents aged 50 or over, for example, are more than twice as likely to be contributing significantly to development than those under 30 years - 44% to 14%. Why age differences influence development activity-like the question of why sex differences appear to do so-should be explored further. Certainly with greater age comes more authority on the job and, perhaps, more professional competence and confidence. When the age-development relationship is controlled for policy authority at the workplace, the age difference remains intact, especially among those with a great deal of authority. Controlling for encouragement also produces little change in the original age differences except in the "least" category of encouragement. Further research might reveal an explanation of why age is influential. In the meantime, generational differences stand as a relatively important determinant of development among these alumni.

When all of the independent variables closely associated with development in this study--that is, whether a job awaits the respondent at home, field of study, campus counseling, English language mastery, regard for U.S. higher education, world region, age, and sex--are taken into account, some 20% of the variation in development activity by the alumni is accounted for. The other variables in the study, the influence of which is too small to treat independently, may account for another 5% of the variation, allowing us to assert that in toto 25% of the variation in development relates to this survey's independent variables.

This is not an outcome that allows one to predict with great authority what does and does not produce significant development contributions. It is certainly better, however, than no road map whatsoever and should suggest both where further research might be useful and what action might be taken to enhance the development contributions by those who plan to study abroad or who have recently returned from overseas study.

3. Career Preparation

As defined above, this dependent variable index measures essentially the alumni's perception of satisfaction with their U.S. education. There is little correlation between the scores on this index and those on the two major indices for use and development. It may, therefore, seem to have no great practical import. Whether this is the case cannot well be judged simply by references to the survey data and findings. Conceivably, a favorable alumni reaction to their education abroad may have important connections to other realms not touched by this survey - e.g., political attitudes, attitudes towards social and economic change in general, and others. Further research into these potential relationships would certainly be worthwhile.

Among the seven independent variables that appear to modify notably the perception of career preparation, academic degree

is by far the most important, at an influence level of 8-9%. Ph.D. holders are most positive (5%) about career prospects as the result of U.S. study. B.A. holders are a close second at 54%, while 37% of M.A. holders share that feeling.

The other sojourn variables which help to determine the outcome on the career preparation index are concerned with whether: (1) campus advice was received, (2) research was required of the alumni and whether it focused on a home country problem and was carried out in the home country, (3) cultural adjustment difficulties were encountered, and (4) length of stay in the United States.

Together the three research questions account for some 3% of the career perception variation, the one asking whether it was carried out in the home country being of virtually no weight. Generally, those who were required to write a thesis and did so on a home country problem were more positive about their career preparation.

The alumni who received intensive academic counseling on campus were also more positive (57%) than those given given little or none (38%). The impact of the variable on career preparation evaluation is 1-2%.

Although only a small proportion of the alumni had more than a few problems adjusting to U.S. culture, those who did were less positive in assessing their U.S. education, the over-all influence level of the variable being about 2%.

Independent of the degree earned, the length of stay in the U.S. exerted a measurable affect on career preparation perception, about 1%. Fifty-nine per cent of those who stayed four years reported a most positive perception; 37% of those who remained two years or less were most positive. The proportion of most positive attitudes among those remaining five years and over and three years fell between the other two.

The pre-sojourn variable related to having selected a career prior to leaving for the U.S. can be assigned a weight in determining variance on the dependent variable of about 1%, those having chosen very definitely being far more positive in proportion to those somewhat or very uncertain.

The only other factor among those tested which seems to have altered the perception of career is encouragement on the job. This synthesis of collegial and supervisory support affects the variance in career perception by some 5%. Among those who have been most encouraged 57% were most positive about their U.S. education, 36% of those encouraged the least were least positive about their education.

The summary influence on career of the independent variables discussed is about 22%. Another 27% can be attributed to seven other independent variables from the survey which were found to have a very minor part in determing career preparation. The resulting total impact accounted for is 24%.

4. Knowledge Transfer

Only four of the independent variables defined in this study appear to have any bearing of consequence on whether and how much alumni taught others what they learned in the United States. And of the four, only encouragement accounts for more than 1-2% of the knowledge-transfer variance. When highly encouraged, 55% of the respondents taught a great deal to others. When least encouraged, only 24% did so. The resulting impact on knowledge transfer was about 6%.

More alumni Ph.D.'s have taught a great deal than B.A. and M.A. holders - 48% to 33% to 36%. The resulting impact on transfer is about 2%.

The time that has elapsed since alumni left the United States is a minor influence - 1% - indicating that those who have been longest at home have been, proportionately, the most industrious teachers. This-perhaps surprisingly-has little to do with age or the individual's policy or supervisory authority on the job.

Finally, the resources of the employing institution have altered the teaching practices of this alumni group to some extent. Fifty per cent of those working in more amply supplied institutions have taught a great deal. Thirty-one per cent of those in inadequately supplied institutions taught at that level. The over-all influence of the variable is about 1%.

The summary impact of these four independent variables on knowledge transfer is a modest 10%. Other variables in the survey account for no more than an additional 1%, meaning that the survey as a whole leaves some 89% of the variance in teaching among the alumni unaccounted for. This is not unduly surprising, since many personal, cultural, and occupational factors are likely to influence the inclination and opportunities to teach.

5. Engineers

Because of the large number of engineers among the alumni, a special study was made of that group. Responses from persons in the five engineering specialties most numerous among survey returns were run against the indices of use, development, and perception of career preparation.

In respect to use of their U.S. education, some 27-29% of the civil and construction engineers were "least" users, as against 52% in the "least" category in mechanical and chemical engineering.

Electrical engineers were midway at 37%. However, when that relationship was controlled for the number of co-workers with education in developed countries, the differences in degree of use of U.S. education practically disappeared.7/ That is, when the number of such co-workers is about the same, all of the specialties have the same use pattern. What accounts for the difference when the foreign-educated co-workers factor is not present is the fact that mechanical and chemical engineers, among the respondents, have the fewest co-workers of that sort.

There is also some evidence - although not nearly as potent as that associated with the influence of co-workers - that when the engineer-use index relationship is controlled for academic degree the original differences are diminished. What accounts in part for that difference is the small proportion of Ph.D.holders among the mechanical and chemical engineers--7% and 13% as compared to 24% and 41% for civil and construction engineers.

Turning to engineering and development, four of the engineering subdivisions show 40%-47% in the "least" category; chemical engineers fall behind at 65%. Controlling the relationship for the independent variables associated with type of employing institution, policy authority, age level, and encouragement did little or nothing to erase the poor showing of the chemical engineers.

The relationship between career preparation and engineering is not of a magnitude to warrant discussion - Chi square is .7564.

C. Alumni Comments

Respondents were invited to answer some questions in their own words. One of these asked those who would not follow the same U.S. curricula if they had it all to do over, what their revised programs would include. Of the 216 respondents who indicated a desire to change their curricula, 189 described the changes they would make. The striking thing about them is their diversity and generally cosmetic quality. Only 30 respondents would elect an entirely new field of study. About half reported they would shift into business from engineering. Another 16 would change majors within a larger field such as engineering.

Most of those who would make changes would add specialized courses to enrich their original major fields. The most popular

---

7/The process of controlling two variables for a third means, in effect, that the relationship between the former is examined for each category of the controlling variable. Engineers and development, for example, would be compared, in the case of control for co-workers, for all engineers with most co-workers trained abroad, then for some trained abroad, etc. This process reveals whether the controlling variable is influencing the original relationship.

additions would be courses in business and management, which appealed to 35 of the alumni. Twenty-three would pursue a somewhat more diversified curriculum; 11 would add computer training courses, and 23 would simply select more up-to-date courses in their basic field. Twelve now believe they should study something about their home country needs. Thirteen wrote that they wanted more practical work experience.

What these fragments add upt to is not manifest. They point to some extent to a heightened interest in business-management training, but in general, the impression one gets is that this group of alumni is probably not any more ready to shed or radically change its previous education than would be a comparable group of United States alumni.

IV. Conclusions

Given the complexity of the findings in this study, it would probably not be practicable, or legitimate, to try to construct a general set of conclusions or recommendations. It should be productive, however, to search for generalities in the content of the finds relative to each of the dependent variable indices. While we do this, the reader should recall the cautionary remarks offered earlier about possible methodological defects and sample bias. They oblige us to view any conclusions as something less than immutable truth.

A. Education Use

The remarkable thing about this part of the study is the uncommonly high percentage of variation on the use index which seems to be accounted for by the combined independent variables. If the findings are reasonably sound, they provide excellent grounds for predicting the use level of future students and guidance to those who are planning to finance the U.S. education of LDC students.

The findings in regard to use suggest that the foreign students who are most likely to make maximum use of their U.S. education will:

- obtain counseling on U.S. education before leaving home
- secure funding from an institution
- receive further academic counseling on campus
- major in agriculture, education, or science
- pursue a Ph.D.
- work in Africa or the Middle East following graduation
- ultimately work in an educational institution
- enjoy encouragement to use their education from colleagues and supervisors

- have co-workers who have studied abroad, preferably in an industrialized country

This ideal portrait of those most likely to use their education is not meant to deny the high probability that others also will do so with equal success. The point is that these determinants, especially the degree level and most especially the number of co-workers with overseas education, will greatly raise the likelihood of full use.

Policy makers and planners in foreign aid and international education agencies should note that while they cannot manipulate all of the influential independent variables, they can take advantage of the most important. Educational programs can concentrate on groups of co-workers or would-be co-workers - a point made with some piquancy by Harold Enarson in his speech at the IIE Conference and printed elsewhere in this collection. They can emphasize awards in fields where use rates are high and favor Ph.D. candidates who now work for, or intend to work for, institutions with good use records.

B. Development

Unfortunately, for policy and planning purposes at least, most of the known determinants of use and development are different, and, in the case of development, the survey has uncovered no more than 25% of the variance causes. Nonetheless, as argued above, that is quite a substantial part of the whole and certainly permits a cautious prediction that the foreign students who are most likely to engage actively in development will:

- leave home with a job awaiting them

- have good command of English

- receive on-campus academic counseling

- major in education or agriculture

- work in Africa following graduation

- have neighbors and associates at home who regard highly U.S. education

- be employed at a central government office, a government organization or an educational institution

- enjoy a great deal of policy authority at work

- have attained the age of 40

- be male (with exception in respect to certain categories of females)

For reasons of policy and practical reasons it will not be possible for program planners to shape educational programs to match

precisely the blueprint outlined above. Women, for example, must not be discriminated against in awarding fellowships because they tend to take a less active part in development efforts. The reasons for this relative inactivity, at least partially explained by differences in age, workplace authority and job encouragement, should be probed even more deeply than was possible in this study. It might be discovered that some female handicaps could be neutralized by minor program alterations, some inexpensive enrichment supplements, and the like.

On the other hand, some of the variables influencing development participation can be controlled to raise the probability that LDC students completing a U.S. education will be strong contributors to home-country development. Fluency in English, campus counseling, fields of study emphasized, age of participants and geographic origins are all factors within the power of planners to manipulate, to some extent at least.

An equally, if not more, crucial question is how to fashion circumstances that would promote use and development activity, assuming that both objectives are worth advancing. Since the correlation between the two is rather low, efforts to maximize the realization of one will not necessarily stimulate the other.

There are several elements, however, which are marginally influential to determining the outcome of both. To the extent that program planners and others in a position to do so can control all of them in respect to a given student, they would be acting in a way to further his or her use and development activity. The independent variables in question are:

- field of study

- on-campus academic counseling

- world region in which the student is employed

- employing institution

- encouragement to use the educational experience

Their total impact on development is about 11%; it is about the same, that is, 11-12%, on education use. Thus, even if one were able to exert direct control over all five, the joint result would not give more than a very modest probability that the students affected would both have high use and make significant development contributions, unless, of course, they were well positioned with respect to other potent determinants of one or the other, such as co-workers' number, age, or authority.

Perhaps the most important general conclusions to be drawn from this study - for both educators and exchange program sponsors - are as follows:

(1) Despite the fact that some groups of students, for a

variety of reasons identified in this study, have made less use of their education than others, the average, or over-all, use is extremely high, 21% having made almost full use, 48% much use, 26% some use and only 5% little or none.

(2) Similarly, the extent of reported involvement in development by the respondents as a group is gratifying, 39% being significantly involved, 50% moderately involved, and only 11% believing they are little or not at all involved.

(3) As a measure of general satisfaction, it is germane, we would argue, that 64% of the respondents would follow the same educational program were they how to come to the United States and, of the remaining 36%, only a few would elect a wholly new curriculum.

(4) Most of the independent variables that seem to influence how much use students make of their education and how deeply involved they become in development are, at least to some extent, manipulable by those who would act to raise the value of U.S. education for students from the developing countries.

APPENDIX

Independent Variables Used in a Study of LDC Alumni

1. Highest degree or diploma earned
2. Length of study period
3. Field of study
4. Major source of funding
5. Extent of pre-departure educational counseling
6. Extent of on-campus academic counseling
7. Whether career field selected before matriculation
8. If yes to the above whether changed during sojourn
9. Extent of difficulty with English
10. Extent of difficulty adjusting to U.S. culture
11. Extent of practical training off-campus
12. Whether thesis required
13. If yes to the above, whether done on a home country problem and in the home country
14. Whether job awaited returnee
15. Period since departure from the U.S.
16. Number of positions held
17. Duration of current position
18. Sector of economy of current position
19. Extent of policymaking authority in current position
20. Relative extent of supervisory authority
21. Type of employing institution
22. Location of employing institution in metropolitan or rural area

23. Number of co-workers educated in an industrialized country
24. Extent of encouragement to use U.S. education
25. Degree of innovation by professional colleagues
26. Extent to which innovation expected of returnee in current position
27. Resources of current employer
28. Regard for U.S. education in home country (country of residence)
29. Country of residence
30. Age
31. Sex
32. Parental wealth
33. U.S. alma mater

CHAPTER III: THE VIEW FROM THE UNITED STATES

Curriculum: U. S. Capacities, Developing Countries' Needs

by Harold L. Enarson

(Speech delivered at the Plenary Session)

Wallace Edgerton asked that I respond to a talk I would not have heard and that I speak "to the question of what is reasonable for foreign students to expect from U. S. higher education and what our institutions should do to accommodate the special needs of foreign students for education that relates to development problems at home" And he added that I should "respond for the U. S. educational system."

Now I cannot even speak for my university -- not without challenge. As for the U. S. educational system, the one safe generalization is that no one speaks for it. Convention dictates that one applaud its rich diversity, its exuberant pluralism. But honesty dictates that one observe that it offers the greatest bazaar of educational offerings (some bizarre) ever provided by any nation at any time.

But perhaps that puts it a bit too sharply. In Ohio we are generally agreed that some kind of higher education is generally a good thing -- generally speaking. By the same token throughout the land the conventional wisdom has it that "international education" -- whatever that may mean -- is a good thing. Definitely -- a good thing. After all, who wants to be called "provincial"?

Thus most of us believe that it's good to have foreign students on campus, good for faculty to enjoy Fulbrights, good for faculty to take overseas assignments with Brazil or the World Bank or UNESCO or the Sudanese Department of Agriculture.

Most of us believe that it's good to take a foreign student to Rotary Club. It shows how cosmopolitan we are. This symbolic gesture saves us the burden of asking what the other 999 or 1,999 foreign students are experiencing in the community.

Most of us believe it's good to have some sort of an international club on campus for foreign students. It shows we care. So perhaps once or twice a year we have "international day" and enjoy Taiwanese cooking and Brazilian guitar. That symbolic gesture saves us the burden of asking what foreign students are experiencing in the dorms and in their classes and in their lives.

Harold L. Enarson is president of the Ohio State University and chairman of the International Affairs Committee of the National Association of State Universities and Land-Grant Colleges.

Some of us -- thankfully a small group -- believe that if some foreign students on campus are a good thing, then having more foreign students on campus is a great thing. The more the better. Recently we have witnessed the unsavory side of our idealism -- a college president visiting Korea and Japan to "fill our classes," and paid bounty hunters who are commissioned by colleges to produce foreign students. So never mind the tragic mismatch of student and program. Never mind the damage that such rip-off schemes do to the good reputation of colleges and universities which have honored unwritten codes of conduct, which have brought realism and sensitivity to this very complex, very human enterprise of accepting young people from foreign cultures to live and study in a foreign culture.

May I make three points, which I propose to state in excessively simple, excessively sharp, terms -- at the clear risk of being misunderstood.

1. Having more and more foreign students each year studying in the United States is not necessarily a good thing. IIE's annual report, Open Doors, which annually shows larger numbers of foreign students, does not necessarily provide a measure of our idealism or of our growing "global perspective." In reality, the movement of foreign students into U. S. colleges and universities is a very disorderly migration -- far more chaotic than we dare admit to ourselves. On the one hand, there is the desperate search for educational advantage (the U. S. degree or even the certificate on the wall which reads "Failed Orals"). On the other hand, there is the reality of U. S. colleges and universities accepting foreign students for no good reason other than that they apply -- and available space exists. For the most part, it is pure rationization to pretend we have strategies of selection or curricula tailored to the needs of foreign students.

Was the eagerness of so many colleges and universities to accept Iranian students in ever larger numbers the expression of our "global perspective," of our desire to assist in "nation-building"? Is it seriously argued that the admissions officers of our respective colleges and universities know very much -- if anything -- about the needs of the LDCs for trained manpower?!

2. Accepting foreign students simply to fill emptying classrooms is an exercise in inexcusable cynicism. Again, the desperation tactics of a few desperate colleges dishonors the whole notion of international education. What are we to think of colleges which frustrate the educational hunger of students from the developing nations, which ignore the handicap of poor preparation in the English language, which count paid enrollments with the greed of a Shylock?

3. We should exercise great care in defining the nature and extent of our obligations as colleges and universities in accepting foreign students. It is nowhere written in state or federal law or in the charters of public institutions or in legislative appropriations that

we have any obligation to accept a particular number of students from any country for any program -- especially since all students in publicly supported institutions are subsidized by state funds.[1]

There may by a clear moral obligation for the rich to help the poor, whether within national boundaries or across national boundaries. I for one deeply believe that there is such a moral obligation -- one [illegible] in the U. S. honor only slightly. But such an obligation rests upon the federal government. In no way does it rest on the individual college or university. If we welcome foreign students to our campuses, our communities, our homes, it is because we believe -- as I trust we do -- that our foreign students enrich our entire educational enterprise.

Permit me to labor the point for a moment. If there is an obligation to open our doors to foreign students, is it an obligation that takes precedence over the needs of black Americans, of our American Indians (LDC nations within the U. S. more deprived than many LDCs around the world)? If there is obligation, what is the order of preference and priority -- the students from the oil rich Middle East, or those from the poorest of the LDCs? If there is obligation, is it to the sons and daughters of the middle-class in Latin America, to the children of the "Honorables" in Liberia, to the children of our own alumni in other lands -- or is it to the poorest of the poor in the poorest nations? Simply to ask such questions is to suggest the quagmire we enter if we begin with the premise that we are somehow obliged to take foreign students simply because they wish to enroll in our system.

No, there must be a sounder basis for our interest in having foreign students in our colleges and universities. Our collective investment in the advanced preparation of foreign students can be justified only on two grounds, both intimately joined. One is that of enlightened self-interest. Whether in Pocatello, Idaho, or Pasadena, California, we deprive our own students of rich cultural experience if they have no opportunity to rub shoulders with fellow students from distant lands and strange cultures. The second ground for accepting foreign students is far more complex. It is, very simply, that we are making a strategic investment in institution building in the less developed nations of the globe.

Here I come to the central thrust of my criticisms.

It makes no sense to open our doors to as many students from the Middle East as may wish to come.

---

[1] No generalization about U. S. higher education is absolute. If there are state laws guaranteeing admission to foreign nationals, these have not come to our attention.

It makes no sense to let family wealth and family connections and individual preference determine which students travel to the U. S. and enjoy the subsidy of a U. S. education.

It makes no sense to fill our classrooms with foreign students simply because they are available -- yes, available in fearful abundance. How many Indians, Taiwanese, Lebanese, Latin Americans, Africans do you think want to come to the U. S. and could profit individually from the prestige as well as the preparation associated with a degree from our universities? Their numbers are beyond count -- and we know this full well.

Is this a plea for Fortress America, for the expression in higher education of the neo-isolationism borne of the Viet Nam disaster? Not at all. From personal experience, I, along with you in this audience, can testify to the great contribution our foreign students can make back home. Graduates of American colleges and universities play incredibly important roles in the development process. I think of Ohio State University graduates who helped fashion land reform in Taiwan, others who are architects of the "green revolution" in India, still others who are pioneering businessmen in Brazil. Our graduates are making a difference in their homelands. But not enough of a difference -- not nearly enough of a difference. Here lies our challenge and opportunity -- for the LDCs and for ourselves.

Earlier I spoke of unplanned, chaotic migration. I mean, of course, laissez faire in the importation of foreign students. Foreign students drift in from around the globe, drift into colleges and universities with open doors, drift into programs promising personal advantage, drift back home (if indeed they do not stay in the U. S.) into jobs promising personal advantage.

What does this have to do with the development process -- with nation building? Very little -- far less than we dare admit.

Several years ago I was privileged to visit the Punjab Agricultural University in Ludhiana, India, and rejoiced in a welcome tendered by 40 or so graduates of The Ohio State University. No scattershot aid here. No attempt to water the desert by sprinkling small quantities of water from a high flying airplane. No, by agreement between the Indian government and the U. S., Ohio State had served as the chosen instrument in institution-building. With the help of AID, promising students had been sent to Ohio State for advanced training, promising faculty had been sent as consultants to help develop the land-grant tradition. The result? A magnificent new university hard at work. A university which was making a difference in the lives of farmers, a university on the march.

Here was technology transfer at its best.

Here was foreign assistance at its best.

Here was U. S. faculty overseas experience at its best.

Here was foreign student study in a U. S. university at its best.

Here was study, both at Ohio State and in India, which enriched their scholars and ours, which contributed directly to the development process, which made excellent use of scarce resources in India and in the U. S.

Here was the reverse of chaotic migration.

Ohio State's sister relationship with Punjab Agricultural University is a casualty of the fading U. S. interest in institution building. Our two universities drift apart. Today the students from India come to us as isolates. They return -- if they do -- to jobs thinly scattered through the vast expanse of India. And so it is with the thousand or so students from foreign lands now attending our university.

Do we know what we are doing in the foreign student business -- let alone why we do it? I doubt it. How many major universities deliberately decide how many students from which countries in which disciplines are to be admitted? Precious few. For the most part, we are without premise or plan, system or strategy. All too often we indulge a mushy sentimentalism: It is so very nice to have foreign students on campus -- until they go broke and create problems, or until they demonstrate.

Let me state my thesis as sharply, as succinctly as possible. The U. S. could, one supposes, fling its doors wide open. Take a million students, take two million from third and fourth world countries. Would this contribute significantly to the development process? Hardly at all: not under present arrangements. The best way to build a nation is to help that nation build its educational system, specifically its colleges and universities. In final analysis, there can be no substitute for strong national universities in every land. The great majority of Indians and Iranians, Nigerians and Nicaraguans must be educated at home -- in their colleges, in curricula dealing with their development problems.

Jonathan Swift once advanced some unpopular questions in his essay, "A Modest Proposal." As I recall, he wrote of boiling babies, of their nutritive value, etc. In much the same spirit, I advance for your consideration six modest proposals:

1. It is by no means self evident that subsidy of foreign students, whether by tax funds or donor dollars, is justified. Foreign undergraduates could well be asked to pay full cost. There would be nothing inherently wrong with permitting the children of the rich (oil rich, for example) to consort with America's on-campus young.

2. In admitting foreign students for graduate study, the full-cost principle should also prevail. This would require the sending nation to weigh costs and benefits and to identify those students and those fields of study in which it wishes to invest scarce resources for purposes of national development.

3. Preference ought to be given to faculty from colleges and universities in developing nations -- men and women who would profit from the upgrading of skills. It does more for "development" in an LDC's agricultural university to upgrade 10 young faculty than to let 100 or even 1,000 LDC students drift into programs of their choosing in places of their own choosing somewhere in the U.S.

4. Every "true believer" in global perspectives, international education, and the like should become actively engaged in the efforts to persuade the U. S. Congress to set up the proposed Institute for Technological Cooperation. This bold proposal promises effective methods of technological transfer, an acceleration of the process by which research is put to the service of mankind.

5. Every college and university ought to ask itself probing questions about its foreign students. Why do we have this particular configuration of foreign students -- by place of origin and by type and level of programs? Can we justify doing what we do, or what we don't do.

6. And finally, we should put this issue of "Relevance" -- which seems to haunt some of us -- in a different framework. If the demand is that our graduate programs develop special programs for foreign students, the answer for most of us must be a resounding "no." At a time when our regular programs are consistently underfunded, it is impossible to justify special advanced programs tailored for foreign students. To ask the wrong question -- "Is this relevant for foreign students?" is to invite the wrong answer. The right question is whether the curriculum is relevant for our students <u>and</u> for foreign students.

"Development" isn't something going on only in the Sudan and in South America. We too are a developing society.

It is impossible to do advanced work in land tenure systems, in agrarian reform, in rural-urban shifts, in industrialization without looking at the Imperial Valley as well as at Taiwan, without looking at the economy of Mexico as well as that of the United States.

To ask the question: How relevant is the curriculum to foreign students is to surface the more embarrassing questions: How <u>relevant</u> is our education to the development of the U.S.? To the assault on

our problems: racism, economic slowdown, inflation, urban decay, and loss of faith in our institutions? It's not a question we want to address.

PANEL 1: THEORY AND PRACTICE OF DEVELOPMENT

Chairperson:
Gustav F. Papanek, Chairperson
Department of Economics
Boston University

Panel:
Harold Lubell
Program Economist
Bureau for Program and Policy Coordination
Agency for International Development

Warren F. Ilchman
Program Advisor
The Ford Foundation

Donald Stone
Adjunct Professor
School of Urban and Public Affairs
Carnegie-Mellon University

Rapporteur:
Richard F. Crabbs
Council for International Exchange of Scholars

SUMMARY

Many developing countries now have the capacity for fundamental-level training in many fields, including economics, management and social sciences. U.S. higher education has made important contributions to this institution-building and now needs to adapt itself to new roles required.

A few highly creditable regional advanced training centers are already available, with appropriate cultural and technological coloration, closer to home than the United States, and staffed by those most concerned with development.

At the same time, LDC people often need training at a higher level of sophistication than in the past, because objectives have become more complex and the LDCs play a more active role in the world economy.

Recommendations

The strengths of U.S. capacities should guide our response to changing needs, to new patterns of training for developing country students, and to a growing world network of higher education.

(1) Most important, the United States should support a series of highly specialized training centers in subjects and sub-specializations requiring too few graduates for many institutions to be involved. In some of these areas, the U.S. has considerable comparative intellectual advantage.

(2) Also required are multi-disciplinary (especially social science and technology) advanced centers for attacking specialized common problems, e.g., irrigation and water policy, food and nutrition, natural resources, population control. This may mean special post-doctoral, short-term programs, training of trainers and "doers", networks of consultation and information. The United States also has considerable advantage in problem-oriented approaches to training.

(3) U.S. curricula, teaching, and procedures should be examined and revised to assure provision of useful education for both U.S. and foreign students. This exercise should seek more attention to common problems, comparison of differences, and cultural awareness even in different U.S. settings but especially in work in developing countries. In the economic area, attention devoted to income growth should be extended to income distribution. In planning, we must teach that proposals must be socially, economically, and politically viable, and organizations must be available for executing what is proposed.

(4) In all areas, graduate education should devote less attention to preparation for academic life and more to methodologies and experience in preparation for applied roles.

(5) U.S. institutions should promote communication and cooperation with institutions in developing countries, recognizing that many of the introductory and remedial jobs can (and should) now be done abroad, but that a need for strong collegial relationships will continue.

DEVELOPMENT THEORIES AND PRACTICES AND
THEIR IMPLICATIONS FOR U.S. COLLEGES AND UNIVERSITIES
By Donald C. Stone

1. My theories or perceptions about development in underdeveloped countries have for many years reflected the experience of improving underdeveloped U.S. local, state, and federal governments, and vice versa. The years confirm that development is at root a process of developing political and administrative capability to do whatever is required to plan and implement objectives, policies, and programs.

- Marshall Plan strategy could rely largely on self-help and mutual help among European countries and the United States in utilizing an infusion of external resources. The assumption by many economists that development in the LDC's could take place by the same process was unworkable.

- Development in the technologically less developed countries is concerned with more than increasing GNP, or GNP per capita. Nor is "modernization" patterned after U.S. or Western institutions and life styles a relevant model.

- Development objectives, strategy, and methods must be designed to fit the specific conditions, aspirations, needs, resources, culture, and capabilities of each country. The criteria of progress should focus on improvement of the human condition and quality of life within a country and to this end on increasing resources and capabilities for progressive improvement.

- Development doesn't happen unless somebody does something. Two kinds of failure. One is thought without action. The other is action without thought. Development efforts of countries have suffered from both.

- Development has often been obstructed and seriously delayed by planning which applied too much thought and too little action. The less developed countries have been smothered with Western-designed econometric models which produced plans that were unimplementable.

- Unless plans consist of viable projects, programs, and operations for which implementation capabilities are in place, not much will happen. If a country's current and capital budgets are not integrated into development plans, or vice versa, not much that has been planned will be achieved.

- Unless development planning includes administrative planning to assure suitable organization, administrative systems, personnel, and management capacities, the results will be disappointing.

Donald C. Stone, Adjunct Professor at the School of Urban and Public Affairs of Carnegie Mellon University, is former dean of the Graduate School of Public and International Affairs at the University of Pittsburgh and a distinguished leader both in public service and academia.

2. One avoidable reason for failure, paralysis, non-performance, poor results in development is the failure of Western advisors and Western educated persons to forget what they learned in the West. One must begin with the situation in a country and develop indigenous solutions.

3. The prevalent assumption has been that development is primarily a matter of economics. Persons with a specific disciplinary or segmented orientation generally overlook operational elements. For example:

- Many economists assume that development is primarily a matter of setting goals, adopting prudent fiscal and monetary policies, applying economic principles and allocating resources, with the assumption that plans are self-implementing.

- Political scientists are generally interested in political processes, study of structures and political ideas, predominantly from an analytical and methodological standpoint rather than political and administrative action.

- Engineers often become engrossed in the technical details of projects, while questions of economic value, social contribution, and administrative feasibility are neglected.

- Public administration professors tend to be more interested in administrative theory, analytical methods, policy choices, and administrative processes in the U.S., with relatively little concern for management or for what is commonly referred to as "development administration."

4. Foreign students and officials educated in the United States permeate the top offices in many countries. They have made an enormous contribution in their home countries.

5. What is the future potential of U.S. universities in educating persons to deal effectively with societal development--economic and social development administration--in countries beyond the shores of the U.S.?

A companion question is the relevance of U.S. education for the staggering number of foreign students and officials studying in U.S. universities, unless course work and other experiences have some relation to the cultural, political, administrative, and technological environments of their countries.

6. Low income (and technologically advanced countries) are becoming increasingly aware of inadequacies in their public administrations and inability to manage. They want a greater number of their officials educated/trained abroad as well as in their own institutions to increase their administrative competence.

7. The faculties of U.S. colleges and universities seem to have little understanding of these developmental requisites. The importance

of administrative management and intercultural competences is not recognized in many places.

In international educational planning and exchange processes insufficient attention is given to the one hundred or more schools and university programs in public affairs/administration that are making some contribution to overseas development. About 20 schools are comprehensive in character, with specially tailored courses and programs focused on development in low-income countries.

8. If colleges and universities desire to respond better to the needs of the LDC's, they should

- Make a far greater effort to create conditions and accommodations which assure a better experience for overseas students.

- Adjust course work and modify teaching in fields which attract foreign students to make their education more relevant.

- Add a substantial component of instruction and research in development administration and intercultural operations and channel more foreign students and officials to these institutions. Such programs should include cooperative linkages with departments of economics, sociology, and other disciplines, and with such professions as engineering, education, public health, and agriculture to produce functional specialists with development administration competence.

9. These and related efforts to make U.S. colleges and universities more relevant require far greater government encouragement and private support.

TRAINING FOR DEVELOPMENT
by Harold Lubell

Since I seem to be the only AID representative at this session, I will review briefly activities of the Agency for International Development in financing and administering training for "participants" from overseas. The trainees are persons who are expected "to participate in the development of their country"; they are not award winners. The bulk of the participants are nominated by the field missions of AID to fill needs for trained and skilled personnel as perceived in the countries where the missions are assigned.

AID's office of International Training responds to and supports decisions taken in the field. Training is provided in the United States, in the participants' home country, or in third countries. Despite efforts to increase the proportion, activities in third countries account for only 15-20 percent of all participants. Another group of participants is generated as part of contracts between AID and U.S. universities in such fields as health, agriculture, and livestock development.

In FY 1978 there were some 7,000 participants in training (6,000 in the U.S., the others in country of origin or third countries), of which 3,000 were new arrivals. The majority of the participants are in an academic setting working for an advanced degree, including an increasing number of Ph.D.'s. There are also a considerable number of non-academic or technical participants in courses lasting from a few weeks to eight or nine months, in business plants, and in 15 or 16 U.S. Government agencies. The largest group, some 300-400 participants, is channeled through the U.S. Department of Agriculture.

With the "new directions" taken by AID since 1973, there has been a marked shift in the fields of training. The currently predominant field of training is agriculture, followed by the health-population-nutrition-family planning complex, and with education running third. Trainees in transport, communications, infrastructure, and industry no longer appear in the AID programs. The AID program participants continue to be relatively sophisticated personnel and are hardly likely to come straight out of the villages, but the projects in which they participate do relate to the "new directions."

From AID's point of view, the proportion of women among the participants (14-15 percent) is too low, but it is gradually rising. This proportion varies greatly by country and by project.

Among the specific issues AID's Office of International Training is concerned about (other than severe reduction of its own staffing)

Harold Lubell is a Program Economist in the Bureau for Program and Policy Coordination, U.S. Agency for International Development.

are (a) that of the rising cost of U.S. education and of maintenance of participants in the U.S., and (b) that of the relevance of some of the training programs financed by AID. In the latter context, for example, the questions are being asked how to get more Ph.D. dissertations done overseas and how to make them more relevant to the problems that the participants are likely to face as professionals upon their return home. A survey of some 80 universities is currently being carried out by the National Association for Foreign Student Affairs (NAFSA) to attempt to identify models that "work" abroad.

I would like to take this occasion to express a few personal biases of my own in the area of training in the United States for development in the LDCs.

One is that intellectual skills, once acquired, can be focused on any of a variety of problems, as perception of the importance of the problems shifts. A technique or an approach taught in a U.S. university that has been evolved to deal with a developed-country problem generates a technical capacity that can be effectively reoriented toward specific developing-country problems. In the field of economics,many of the same constraints have to be faced in developing countries as in developed countries, and the techniques for studying and dealing with them remain basically the same. What has to be incorporated into the standard economic approaches is a better grasp of the effects of differences in social anthropology between and among developed and developing countries.

Another personal bias is that there are several major advantages to studying development problems away from home. Among them is that distance can clarify the shape of those problems. Also, getting the trainee out of his immediate social environment may give him some perspective on the realities of the class structure within which he operates at home. A third advantage is, of course, the opportunity that may be provided to compare the problems of his own country with those of other LDCs.

A third personal bias is that development studies in the U.S. are useful for U.S. perceptions of the realities of the developing world. Getting LDC nationals into development study programs in U.S. universities develops future lines of communication between U.S. scholars and officials and LDC scholars and officials who will at least part of the time be able to handle the same intellectual concepts and thus speak to same language.

Finally, I would like to put forward my own parochial view that greater attention should be paid to the employment aspects of the problems of economic development, as they affect both the LDCs and the U.S. and the other industrialized countries. If wider expertise were developed in this field in the U.S., it could be combined with research and practical field projects using U.S. and LDC students in U.S. universities to find needed solutions to some of the more intractable aspects of the development problem.

PANEL 2: ENGINEERING

Chairperson:
Merton R. Barry, Director
International Engineering Programs
University of Wisconsin-Madison

Panel:
Dale A. Carlson, Dean
College of Engineering
University of Washington, Seattle

Franklin Ahmaz, Assistant Dean
College of Engineering
Cornell University

David Reyes-Guerra
Executive Director for Education
Engineers' Council for Professional Development

Vladimir Yackovlev, Executive Secretary
FONINVES, Ministry of Energy and Mines
Caracas, Venezuela

Rapporteur:
J. W. Cowan
National Association of State Universities and
Land-Grant Colleges

SUMMARY

PREAMBLE

Engineering is the profession in which a knowledge of the mathematical and natural sciences (gained by study, experience and practice) is applied with judgment and social sensitivity to develop ways to utilize economically, with a concern for the environment and the need to conserve resources, the materials and forces of nature for the benefit of mankind.

Engineering as a profession is much sought after by foreign students, and they come to the United States for engineering studies. The educational community recognizes the need to pay serious attention to this clientele, while at the same time meeting domestic commitments.

The panel found it difficult to address specifically the types of curricular relevance for foreign students. Engineering concepts are by nature universal. Special programs for foreign students were not deemed appropriate, but existing curricular flexibility (elective courses, practical training, etc.) should be used to best advantage.

Stress in engineering education should continue to be placed on the use of basic concepts in problem-solving methodology, teaching the student, whether a U.S. national or a foreigner, to adapt these concepts to the particular problem at hand.

RECOMMENDATIONS

The panel believes that the engineering profession, through its constituted bodies: The Engineers' Council for Professional Development, the U.S. Commission for International Relations, and the International Division of the American Society for Engineering Education, carry out a program of implementing the following recommendations. The above organizations are the working arm of the profession and as such have the responsibility for the total picture of engineering education. Other organizations interested in foreign education should offer their cooperation and assistance to the engineering profession in support of programs developed by them.

General Recommendations

1. Adequate knowledge of and the ability to deal with and use technology are essential ingredients in the successful emergence of developing countries.

Recommendation: That the developed countries recognize educational programs adapted to individual countries as prized exports and actively provide for the educational transfer system, much as is done for other export products.

2. Educational processes for developing countries should assure that the education received is a valuable export molded to fit the developing countries' needs.

Recommendation: That educational programs be developed which encompass education for both the professional and technical levels, avoid brain drains, provide ways of meeting basic human needs through both advanced and appropriate technology, and be incorporable back into the social fabric of the developing country.

3. Current educational needs of developing countries encompass technological competence translatable across cultural and industrial boundaries; social acceptance of new construction is a necessary part of successful engineering design.

Recommendation: That educational programs be encouraged to further the appreciation for cultures, business methods, and communication skills in the education of engineers and scientists.

Specific Recommendations

1. In view of the fact that the plenary session speakers as well as the panels on Engineering and Engineering-Related Technologies are strongly of the view that the U.S. curriculum in the areas of engineering and engineering technology not be altered specifically for international students,

The panelists recommended that the panelists and the professional organizations they represented, continue to work with the organizers of this session to formulate a positive, professionally acceptable and workable response to the charge contained in Ambassador Wilkowski's letter of February 23, 1979, to Mr. Wallace P. Edgerton.

2. To help meet the needs of LDCs for manpower and for developing a sound base of engineering technology, U.S. universities, in co-operation with the U.S. Government, should broaden their involvement in institutional development activities in LDCs. More long-term institutional linkages should be established. LDCs should be assisted in developing appropriate national and regional accrediting systems. Increased funding from U.S. Government sources and private foundations is needed to support such an expanded institutional development thrust.

3. For the education of foreign students in the United States, more attention needs be paid to offering practical training and practical experience. Graduate students, whenever possible, should conduct thesis research in their home countries. Also, they should be exposed to extra curricular learning in university administration, project management, and the like, to provide the additional insights most will need when they return home.

4. Counseling and guidance of foreign students by an informed group of faculty members needs to be organized:

(a) Foreign countries, through their professional engineering organizations, universities and appropriate government agencies, should prepare detailed documents on the specific curricular expertise needed.

(b) Organizations with expertise in curriculum content should be contracted to carry out the placement of students in U.S. universities.

(c) Student advisers should work out the students' course placement based on the relevance of those courses to the student's home engineering environment.

5. Provisions should be encouraged to enable students to take theory courses in their home country and complete the remainder of their program in the United States.

6. To gain a better over-all perspective, students who do not have a specified field of unique expertise should be considered for transfer between universities that offer different courses in relevant areas.

7. There should be Federal funding to facilitiate the cooperation between the U.S. technical education community and international organizations whose purpose it is to promote economic and social development.

8. The Federal government should allocate funds for planning practical training and collaborative research in cooperation with U.S. educational institutions and industry in the United States.

In executing the above recommendations with regard to LDCs, their wants should have equal importance with the enlightened self-interest of the United States.

INTRODUCTORY REMARKS
by Merton R. Barry, Chairman

There is an element of effrontery in the title of this morning's session: "Curriculum: U.S. Capacities, Developing Countries' Needs." It carries a certain implication that we in this forum know developing countries' needs. There is a certain implication that there are common needs that run across the range of countries characterized as "developing."

In any discussion of anyone else's needs we should be fully aware that there may be a decided difference between needs and wants. I suspect many technical-assistance efforts have foundered because this difference was not discerned. With this caveat, I would like to note some efforts that have been made to determine the wants of some developing countries as seen by their own nationals.

The Institute of International Education solicited comments from embassies in Washington concerning their views of their own priorities in education in the next few years. The returns were scanty by December, but I have looked at replies from a few of them. It will be no surprise to this group that all of them list engineering and engineering technolgoy among the highest priorities.

The Institute also inquired through 69 U.S. Embassy Cultural Affairs officers and USAID missions abroad how U.S.-trained nationals were regarded by the business and government communities where they were located.

Again, it should be no surprise that the U.S.-educated person is generally well regarded and after some initial frustrations, seems to rise to positions where his or her education is effectively used. Of the 16 responses focused specifically on technical training or education, the common comment was that government and business leaders found the willingness to identify and attempt to solve new problems the most distinguishing characteristic of the U.S.-educated professional.

Perhaps this attitude comes about because of the curriculum. Perhaps it comes from associating with people exhibiting the attitude that problems can be solved, or at the very minimum that the attempt is exhilarating and a worthy human endeavor.

I recall a quote from a speech to a conference of the American Society for Engineering Education in 1963 by Dr. Nathan Pitts of the U.S. Office of Education. He said, "The most important

---

Merton R. Barry, Director of International Engineering Programs at the University of Wisconsin-Madison, is chairman of the Joint Committee on International Activities of the American Society for Engineering Education.

educational experiences to the future effectiveness of the foreign student educated in the U.S. occur outside the formal classroom."

As we discuss curriculum in its broadest sense, we might keep this in mind.

Evidence of the attractiveness of the U.S. educational system and particularly of technical education is seen in the numbers of students attracted to our shores. The Institute publishes Open Doors yearly, and I'm sure you are familiar with it. The most recent figures show there are 235,000 foreign students in the U.S. in 76-77. Composing the largest single group, fully 26 per cent of them are in engineering.

In 1977 and 1978, 45.8 per cent of the graduate students in engineering were from abroad.

Whether they find their wants satisfied or not, they do come in rather large numbers. Probably in no other area is the impact of sheer numbers of foreign students greater than in the graduate programs in the engineering colleges of this country.

In the spring of 1978, Dr. Robert P. Morgan of Washington University in St. Louis surveyed the member colleges and universities of the American Society for Engineering Education to learn how many of them had special programs or a particular person responsible for the international students and the international programs. He found, in a 50 per cent response to 409 questionnaires mailed, that 21 per cent reported having formal international programs. These 42 institutions report 56 separate programs. Of this number, 48 were reported by 33 engineering colleges. There are some problems of definitions in the data, but 34 of the programs involve developing countries only. Interestingly, 18 programs involve OPEC countries.

The Institute of International Education surveyed 84 of the U.S. institutions in the Morgan study, limiting themselves to those reporting 500 or more foreign students. Of the 32 schools responding to this questionnaire, only eight reported having programs designed especially to meet the needs of students from developing countries. This does not accord with the responses received in Morgan's study, but his figures are based on a larger response and not limited to schools with more than 500 foreign students as was IIE's.

We should also note that while Morgan's study sought to identify special programs, the IIE study also sought to identify course content addressed to the special needs of developing countries. Here we find the engineering school curricula faring better. Nineteen institutions indicated they have 267 such courses.

However, the responses to the question, "Are we or should we be making an effort in this direction?" are generally not encouraging. I won't repeat them here but refer you to the survey summary. On the negative side, the problems, mainly financial, seem to prevent serious efforts. On the positive side, a number of institutions report that they already attempt to tailor study programs for students from developing countries to meet their special needs. My impression from these reports is that there is a great deal of room for improvement in both our efforts and in the general climate of opinion in which they could take place.

We have asked four panelists to present their ideas for consideration. In trying to structure the panel, we thought to focus on the kinds of special programs for international students which might be most useful for their future careers. We might have considered those most suitable for persons planning to return to an academic life, professional practice in multi-national firms, private sector/local enterprise, government bureaus and ministries or in administrative posts or as research directors.

Instead, we have four people who will bring a specific point of view from a particular background. Dr. Dale Carlson is dean of a college of engineering, and one who believes there is a positive role for specially designed programs. Dr. Franklin Ahimaz is an assistant dean and active internationalist who will present a view of the roles of universities, government and industry in providing a stronger U.S. educational experience for persons from the developing countries. Dr. David Reyes-Guerra is executive director of the Engineers Council for Professional Development, our accrediting agency, who brings his knowledge of some of the factors which constrain the development of special curricula especially at the first degree level, as well as his experience in many other countries which have sought help in quality assurance for their own programs. Dr. Vladimir Yackovlev is a U.S. Ph.D. and professor of civil engineering in Caracas, Venezuela, and is currently in charge of his country's truly massive program of rapid human-resource development to meet the needs of the growing iron and steel industry.

I hope their presentations will set forth some new ideas and provide a basis for further discussion and some sound recommendations for all organizations concerned with international education.

AMERICAN EDUCATION SYSTEM
FOR FOREIGN STUDENTS
by Dale A. Carlson

Engineering education is not solely training in engineering techniques. Engineering educators trust that the process provides for the development of educated, competent leaders capable of successfully incorporating engineering technology into cultural systems, when it is appropriate to do so.

Although many would argue that the master's is the first professional degree, engineering is one of the professions where the bachelor's degree provides admission to the field. Because of this degree pattern, the educator expects science and mathematics proficiency in the entering student that is at significantly higher levels than for the average freshman student.

The educator also normally anticipates that the student already comprehends American cultural approaches to the application of technolgoy quite often expecting the student to have assimilated a series of regional value judgments. Thus, even though fields such as mathematics might be easily translatable across national boundaries, the successful application of science and mathematics as aspects of engineering proposals for maintaining societal and personal well being requires the use of judgmental values which should be already inculcated in the mind of the student.

Professional engineering then is the application of science and mathematics to providing for the well being of man. It is successful only when the engineering design and developments are easily assimilable into the current cultural milieu. Indeed, engineering products often are most successful when they are least noticed. One, for example, wants the air conditioning to work so well that no noise is heard, no draft is felt, no machinery or venting is seen, no odors are detected and no significant cost is added to the user's bill. All this is to be accomplished while making the user feel secure and confortable. Water supplies in the United States are expected to provide safe, potable water at a reasonable pressure and flow at a convenient temperature, in clear colorless form, reliably, continuously, without leaks, drips, breaks, at a cost of less than 0.5 per cent of the cost of gasoline.

In the provision of disease-free environments, clean water, and comfortable living quarters, engineers have done more to prolong and enhance life than has corrective medicine. Even with a most successful past, the engineer of today must not just come up with an answer to a problem, he must provide multiple alternatives, be able to explain convincingly why the suggested alternatives are

---

Dale A. Carlson is dean of the College of Engineering of the University of Washington.

reasonable approaches, and then, in concert with the public, develop the logistics and assimilation patterns for adapting the chosen alternative into the community.

Thus the engineer must possess sociological, business, and communication skills as well as appreciation for cultural views and values. It is no wonder then that engineering degrees are only a license to learn and that engineering education is lifelong. It is also no wonder that engineering education is one of our most prized exports, especially since it can be taught in the United States at a variety of campuses, from multiple philosophical views, over various time frames, with a multitude of learning techniques and transfer systems.

Engineering is the field of choice for one-fourth of the more than 200,000 foreign students in the United States. The value of this educational field to the individual and to the home country is worth the imposition forced on the foreigner of accepting this professional education under the trappings of the American culture. It forces the foreigner to overcome his own cultural impediments in the American system and then to retranslate the material learned for acceptance into his own cultural milieu. It should require, as well, that the socioeconomic, psychological, ethical and spiritual values and mores of the student's home country be woven into the student's decision-making tool kit.

Many of the engineering programs in the United States are responding to the large influx of foreign students by providing project and research topics associated with the student's home country. At times these projects are done in the home country, to facilitate assimilation of the student back into the job market and professional activities of his homeland.

The fields of engineering, thus, have become prized areas of study for many who wish to make an impact on their home country. It would seem that horizons for engineering are at their highest point of esteem in years -- and on the ascendancy. The revulsion with engineering production expressed in the last decade has faded into a roseate expectation that engineering backgrounds, used with prudence, can provide the needed expertise for approaching so many of today's quandaries.

The kaleidoscopic change in popular perceptions of engineering comes, however, at a time of increased public reluctance to provide the necessary investment capital to fund engineering programs adequately. At a time when enrollments and entrance demands are the highest ever, universities and colleges are establishing quotas on engineering student populations that in some cases reduce current enrollment levels. Thus entrance requirements rise and, looming ominously, the potential for resentment toward using tax dollars to support programs where significant fractions of the student

population are non-citizens, with concomitant refusal of entry slots to U.S. citizens.

Today's engineering students probably include those people looking for the best route to a career position. The group also includes, however, a growing number of students who recognize the value of being of service to society and recognize the opportunities that engineering philosophy provides for rational decision-making and problem-solving. Today's students appear to recognize that freedom of choice is a most valuable commodity and that adequate mechanisms for incorporating wisdom into making those choices is a priority item for them. There appears to be no need for conflicts between science and creed, only a need to continue throughout life to accumulate the knowledge of science so that technology can be useful in maintaining one's ideals and goals.

It is, consequently, important to recognize that engineering education, as a pathway for incorporating scientific information into rational decision-making, is a valuable commodity desired and needed by ever-larger populations of both the engineer and non-engineer. It is prized by both developed and developing countries. What is important now is to differentiate between the tax dollars invested in building up our nation's body of expertise and tax dollars that are investments in furthering the cause of developing countries. The use of the engineering education systems should be clarified as to support of the developing country's needs as opposed to use of the system as an access route to the U.S. job market.

It would be well to consider the educational process as having two stems: the one providing people educated in engineering principles for the American society, the second coequal system providing both appropriate and high-level technology for the developing country geared to that country's societal needs. Since adequate knowledge of technology and the ability to use that technology are essential ingredients in the successful emergence of developing countries, the process of education should assure that the education received is molded to fit the student's country's needs rather than one packaged in purely American trappings. Because of the responsibilities that will rapidly accrue to these graduates, their educational program should provide concomitant appreciation for cultures, business methods and communication skills. The educational process must entrain the esoteric while terminating with a system that integrates into training on the job.

The education of the developing-country student should then avoid brain drains, provide ways of meeting human needs by developing both advanced and adequate technology, and be incorporable back into the social fabric of the developing country. With adequate preparation, this bimodal system should provide for overlapping between citizen and visitor.

In summary:

(1) The U.S. can and does provide quality education for large numbers of non-U.S. citizens as one of our export activities. It is the largest such program in the world.

(2) The current system is, in general, centered on U.S. concepts and needs.

(3) The current tax constraints on public higher education are developing enrollment restrictions on engineering education at a time when industry needs many more engineers than in the past decade. Thus, although education for the foreigners is important, their supplanting of American students will vex both taxpayer and industry.

What is proposed here is education of foreign students from funding clearly separated from state student credit-hour and operated sequentially in both the home country and the United States, with the gist of the program including:

(1) An initial orientation in regional centers at or near the student's home country, taught by U.S. professors and engineers in close concert with local authority.

(2) A second orientation in the United States at the institution providing the engineering courses on such concepts as American English and ethics.

(3) A professional engineering program meeting at least ECPD requirements but focusing heavily as well on culture, business, communications and human dimensions of engineering.

(4) A final term which would be engineering design done in the home country under supervision of U.S. and home-country engineers and professors on a project of value to the home country.

(5) This final design step then could include U.S. graduate students interested in developing country engineering as a thesis research topic. The purpose of this step would be to provide additional perspectives toward incorporating both adequate and high level technology into the developing country both from the home country view and from the American engineer working in the U.S. but having appreciation for foreign application of developing American technology.

Finally, for any nation, the education of engineers is a profitable investment. Its value to the United States, to developing countries, and to international relations can be enhanced by further recognition of its immense potential for providing much for the good of mankind. The fine, diverse educational system now in use can grow in stature and in value as the educational aims and issues are clarified and pursued with enthusiastic support.

A "TROIKA" U.S. RESPONSE FOR PROVIDING ENGINEERING EDUCATION AND TRAINING FOR INTERNATIONAL STUDENTS

by Franklin J. Ahimaz

I. Evolving Trends

International students enrolled at U.S. universities and colleges are fast becoming a significant minority group within the total U.S. student population. Over 235,000 international students were enrolled at U.S. universities for the 1977-78 academic year, and projections are that this number will most definitely increase, and increase significantly.

More than 25 per cent of international students in the United States are seeking careers in engineering disciplines. Twelve per cent of undergraduate engineering degrees and 27 per cent of engineering doctoral degrees granted by U.S. universities were awarded to international students.

> Several significant changes will undoubtedly take place in the next five years. They include great movement from the following countries: Iranian students will undoubtedly increase consistently and regularly each year. The Saudi Arabians will continue to send more students to this country. The present emphasis is at the undergraduate level but there is every indication that many will remain on for graduate programs. Furthermore, Saudi Arabia itself will soon be graduating a good number of undergraduate students and they will be seeking graduate training in the United States. The Nigerian need for trained manpower continues; and the capacity for that training at home is limited. There is every indication that the numbers will continue to rise. Japan, not a developing country, but one sending significant numbers to the United States will continue to do so. Unlike earlier years when the Japanese students were coming more heavily at the graduate level, the undergraduate students may well begin to increase, preceded by an extensive period of English language training in this country. Other countries such as Brazil and Indonesia have both shown significant growth in the last few years. A newest country to enter international education at the end of this decade is China. By the spring of 1979 these exchanges will be well underway and there is every indication that the numbers will be very large. 1/

Franklin J. Ahimaz is director of the Division of Basic Studies, College of Engineering, Cornell University.

1/ Trends in International Student Admissions - Needs and Responses - Cassandra A. Pyle, Institute of International Education; Proceedings College-Industry-Education Conference, February 1979.

II. The Dilemma Facing U.S. Universities

The demand for higher education from the international community is occurring at a period when U.S. universities are experiencing financial difficulties. The lean years facing many U.S. universities are marked by no growth, retrenchment, declining enrollments, oversupply of staff members, underutilized facilities, costs far exceeding income, and an increased demand for accountability. The contagious Proposition 13 mania has begun to haunt institutions of higher learning as well. Undoubtedly, the Bakke decision may force universities to become unduly cautious about admitting international students to special education programs geared to the socio-economic needs of developing nations.

Under such a state of uncertainty, it is unlikely that U.S. universities will take a positive view of the existing demand for engineering education from the international student community. On the other hand, engineering education might be the least controversial and easily exportable commodity we have to offer the international community. It may be more readily exportable than our political system, our economic structure or our sophisticated technology. From the university's standpoint, it can become a source of income, particularly during periods of financial stringencies.

To organize and respond effectively to the evolving trends in international engineering education, a joint effort is required. The participants in this effort will include the U.S. government, a select group of U.S. universities, and U.S. industries engaged in international programs. The three entities should become active partners in this joint venture. Without the full participation and cooperation of each Troika member, it will not be possible for the United States to package and offer a marketable educational package designed to meet the needs of the international community. The commitment from each Troika member should be firm and continue over a period of at least ten years. After that period, it may be necessary to conduct a thorough evaluation of the program with inputs from the international participants. This does not mean that there will be no change in the program as originally conceived. In fact, there should be ongoing assessments and modifications in the program based on inputs from feedback mechanisms.

III. The Marketable Engineering Educational Package

A. Curriculum

At present, there is a demand for engineering educational programs for international students that are "relevant and appropriate" to the developmental needs of emerging nations. If a specially organized engineering degree program for international students is structured, it might be too restrictive and viewed as "second class" education by the international community. The undergraduate engineering curriculum in the U.S. is aimed at providing a firm understanding of the basics in science and engineering principles,

so that a student can appropriately apply scientific fundamentals and problem-solving methodology to problems that may arise in his/her field of interest. I submit that a firm grasp of the fundamentals together with the techniques and approaches to analyzing and solving engineering problems is essentially the same whether the student practices the engineering profession in the United States or abroad.

At the graduate level, however, there needs to be some flexibility in the educational program. Also, there is need for sound counseling by an informed group of faculty members.

The counselors should be aware of the developmental plans and problems in each student's native country. If a graduate student is determined to pursue an educational program that is highly specialized and of little immediate relevance to the needs of his/her home country, then the student should be advised of the potential problems of finding employment at home and the likelihood of becoming a brain-drain candidate.

The flexibility in the graduate program relates to permitting an international student to conduct research on a topic relevant to his native country and utilizing the research towards his/her master's (or Ph.D.) degree. Such flexibility already exists in some professional master's degree programs at U.S. universities. The advantages of such a program are

(1) It allows the student to conduct research on a topic of relevance to his/her home country.

(2) It provides the student with the opportunity to demonstrate his/her competence to officials in the student's home country and thus find a suitable placement consistent with the student's training and interests.

(3) While conducting thesis research, a professor from a university in the home country might be selected by the U.S. institution to serve as the student's research advisor in the field. The host-country adviser might serve on the student's thesis committee, thereby strengthening linkages between the U.S. and foreign engineering institutions. This approach will strengthen the counseling program for international graduate students.

B. The Job-Related Training Program

A common deficiency in the background of an international engineering student is the lack of exposure both to engineering field experience and to the use of a wide range of engineering tools and methods. Engineering students at the undergraduate and graduate levels may not have had the opportunity to work with a wide array of tools, to tinker in a basement workshop, to assist in a family housebuilding project, or to build models and enter science contests at school. It is impossible to correct for the absence of gradual engineering exposure during the formative years by a massive dose of practical training at the college level. Yet some engineering training program is necessary to provide students both with an understanding of engineering field

experience, engineering management practices, and an appreciation of the dignity of manual labor.

The marketable educational package refers to engineering-educational programs at the undergraduate and graduate levels with practically no changes in existing curricula. However, at the graduate level there should be some flexibility in thesis research effort. The package includes a training component that provides exposure to engineering field experience and engineering management. Some U.S. engineering colleges that participate in cooperative programs with U.S. industries have successfully organized and monitored the training programs for U.S. engineering students. Thus, a precedent has been established. What is needed for international engineering students is the cooperation of a group of U.S. industries, research institutes, and experimental stations, etc., that have active programs abroad, to structure a six-month-to-one-year training program in the United States to provide the international students with the missing link in their total educational experience.

Undoubtedly, it will be beneficial for U.S. industries to link with U.S. educational institutions to organize and offer such a training program. It can provide U.S. industries with promising trainees for potential employment in their overseas operations. Participation in such a training program might also be viewed favorably by host governments when deciding on contracts with U.S. industries, construction firms, etc.

C. The Brain Drain Problem

However, there is a pitfall in offering such an Engineering Educational Package. The foreign nationals receiving such training might well become a brain drain from the developing country. The brain drain problem is a burning issue that will be highlighted at the forthcoming 1979 UN Conference on Science and Technology for Development (UNCSTD). The Program of Action2/ prepared by the UN Conference Secretariat reflects consensus on concerns and recommendations made in the National Papers and Summaries from 105 UN member countries. According to the Program of Action:

> Most developing countries recommend that an overall strategy should be drawn up to halt the brain drain and to repatriate their trained personnel. This problem has been particularly emphasized by the least developed countries.

2/ Draft Outline of the Programme of Action: Note by the Secretary General on UN Conference on Science and Technology for Development. Reference A/33/303 Rev 1, dated January 5, 1979.

At the present time, existing U.S. immigration laws and visa classifications make it difficult for international students to participate in such a training program. Thus, U.S. visa classifications need to be modified to allow such a training opportunity for international students who decide to follow the engineering educational package program. Also, before a host government agrees to sponsor a student to this integrated educational program, there must be a clear understanding between the student, the host government and the U.S. Government that the student will return to his/her native land on completion of the educational program in the U.S. Such clearly drawn contracts will help control the brain drain of international students participating in this program.

IV. Funding

To organize and put together such a marketable Engineering Educational Package, comprising engineering education and job-related training, it will be necessary for funds to be made available to U.S. universities and industries for structuring and marketing such a package. There should be an incentive and reward system built into the program so that U.S. universities and industries that participate in the joint effort will find it attractive to compete for inclusion in the program. As a start, maybe three to five centers in the U.S. may be created where different types of educational packages can be offered. The program at each center will be publicized and fully paid participants sought. Continued financial support from a U.S. governmental agency will be necessary during a 10-year period to develop the program into an attractive and marketable export product. Beyond that period, the program is expected to be self-supporting.

V. Respective Roles of "Troika" Members

A. U.S. Universities

(1) Review liberal and natural/social science elective courses in undergraduate engineering curriculum at U.S. universities (presently 10 such courses are required at ECPD-accredited universities) to recommend a liberal course program that will benefit international students participating in the undergraduate engineering educational package program.

(2) Structure a flexible graduate program that will enable international students (master's or doctoral candidates) to conduct their thesis research in their respective countries; and to explore opportunities for faculty members from host educational institutions to serve as thesis research advisors to these students. A parallel counselling program is vital to the success of the program.

(3) Interact with a select and interested group of U.S. training institutions that have programs abroad to structure the training component of the engineering educational package. The list of U.S. training institutions should represent the breadth of engineering activities appropriate to developing countries --

industries, construction firms, consulting engineers, management organizations, research institutions, etc. It might be appropriate to include some of the U.S. government institutions such as Experimental Stations, Bureau of Standards, etc.

(4) Devise mechanisms to select U.S. training institutions.

(5) Monitor the training program with representatives from U.S. training institutions. Ground rules for gauging successful performance in the training program should be established.

(6) Manage the educational and training components of the engineering educational package. Feedback mechanisms to provide inputs to modify the program should be instituted.

(7) Administer the entire program,which includes financial aspects of the project; prepare yearly reports and a complete review of the project after 10 years.

B. U.S. Training Institutions

(1) Participate in a coordinated training program and plan training within the respective institutions; identify supervisors who will oversee the training and evaluate the progress of participants.

(2) Prepare outline and cost of training program; also establish minimum number of trainees consistent with facilities available at institutions, the length of training program, accommodation for trainees, etc.

(3) Participate in the yearly assessments and final evaluation of the total project.

C. U.S. Government Agency

(1) Assist in suitably modifying visa classifications that will permit students to follow the education plus training package without problems from immigration authorities.

(2) Assure that participants will return on completion of the program.

(3) Furnish start-up funds and a ten-year grant so that the program can quickly take root and become self-sustaining as early as possible and definitely before a 10-year period.

(4) Engage in government-to-government promotional efforts that will provide fully paid students to the program. However, the U.S. educational institutions will decide on whether or not to admit a particular student to the program.

(5) Feed inputs from USAID field programs that define the type of engineering needs in developing countries.

(6) Participate in established mechanisms for collecting fees, living expenses, etc. for students sponsored by foreign governments.

(7) Cooperate in annual evaluation of the project and the final assessment at the end of the 10 year period.

VI. Conclusion

The demand from international students for appropriate engineering education is mounting steadily, and the number of international students at U.S. universities is bound to increase significantly. A "Troika" team effort by U.S. universities, U.S.industries, and U.S. Government agencies can structure and offer a marketable engineering educational package to meet the demand. The sooner this opportunity is recognized, the earlier can the United States respond to the rising demand. Such a response can be beneficial to each member of "Troika" and appropriate to the needs of the international student community.

PANEL 3: BUSINESS ADMINISTRATION

Chairperson:
Donald C. Carroll, Dean
The Wharton School
University of Pennsylvania

Panel:
Allen Bonnell, President
Philadelphia Community College

Stefan Robock, Professor
Graduate School of Business
Columbia University

Brother Leo Ryan, C.S.V.
Dean, College of Business Administration
University of Notre Dame

Rapporteur:
Robert N. White
Institute of International Education

SUMMARY

In general, these business school representatives seemed to believe that what they were offering was quite adequate, since foreign students flock to them, apparently get what they want, and go home "to make their own translation." Students from the LDCs form too small a proportion of business school enrollments to have either special programs or special course content developed for them. What work has been done in this direction has been for U.S. students interested in the developing countries.

There was some recognition that business school graduates tend to go home and go into business, rather than into development. That seems hardly surprising. There was general agreement that business schools teach analytical skills, decision-making, and problem-solving, and those talents, rather than any specific knowledge of field or technique, were the most important acquisitions of any student in a U.S. business school, whether from an LDC or otherwise.

There was no expression of a need for change. However, IF there were to be a reallocation of resources, the panel felt the effort should be in building institutions in the LDCs rather than designing or re-designing courses at U.S. universities. Another possibility would be for a few selected universities to devote resources to developing special courses and curricula and then concentrate LDC business/administration students at those institutions. Otherwise, the LDC students are too few and too scattered to make it worth while for any single business school to make that major investment in time and money.

Bonnell touched on the possibility of college consortia making agreements with developing countries to provide a range of educational, training, and consultative services.

Dr. Bonnell (speaking for junior and community colleges)

The junior and community colleges (JCCs) are "instruments for the democratization of higher education". They are multipurpose institutions, offering career, adult and continuing education and support services to students from the community. The foreign student population of JCCs has risen to 58-68,000 in the last decade or so, and now constitute one out of five foreign students in the U.S. Of these, 20 per cent are enrolled in business and commerce courses.

JCCs are attractive to foreign students because of the low cost, the emphasis on teaching skills and the flexibility of the curriculum - JCCs can respond quickly and easily to needs. But JCCs are funded by local taxes; they are specifically oriented to local needs; they have little or no student housing, and the costs to them of serving foreign students is high.

The relevance of JCC business courses to the foreign student depends on the level of development of his home country, its "orientation" (by which he meant the French, British, American, etc., systems), the acceptability of the Associate Degree at home and the depth to which American business methods had penetrated the country. JCCs give good mid-management preparation, but it is geared squarely to U.S. and local needs.

The most useful and popular courses were in the principles of management, economics and business, the management of particular enterprises such as hotels and restaurants, small business management, accounting and statistics. Least useful were courses oriented toward the operation of the free enterprise system or particularized courses with no relevance to students from non-capitalistic countries.

"We don't want to exchange American snake oil for foreign crude," he said, arguing for a careful brokerage service to match LDC needs with U.S. educational offerings. Huckstering is out. It was here that he raised the "mutual educational assistance" agreements scheme between LDCs and U.S. college or university consortia. He also made a strong pitch for building institutions abroad and held that the JCCs could play a useful role.

Brother Ryan (speaking for the undergraduate colleges)

The Notre Dame School of Business Administration was founded as the School of Domestic and Foreign Commerce, and he felt they had a fairly good record of global awareness. Very important to internationalize the faculty and give them opportunities to travel and work abroad. Undergrads are encouraged to attend programs abroad that Notre Dame has established, including a center in London offering one

semester for credit. They have an "urban plunge" program whereby students and faculty spend a week in a ghetto area, and a program for faculty takes them down to the Caracas barrios for a spell.

The business school also has a multinational management project which sends teams to work abroad in certain countries, and they have an active program of using resident foreign students as resource persons. (The other panelists acknowledged that Notre Dame is doing a very good job in this respect.)

Notre Dame is receiving foreign students into its MBA program with no effort to adapt the curriculum to their particular needs. Unnecessary. Foreign students come to the Notre Dame business school because they want what is offered, and they make their own translation when they return home.

The curriculum is probably not relevant to LDC students; one inserts the students into the program and "lets them make their own success." Notre Dame does, of course, do all the standard things to make foreign students comfortable. If we really wanted to undertake a specific mission to train LDCers, we could do it, Ryan said, but that would take a special commitment that is unlikely to happen. We feel we are doing what we should and that it is working satisfactorily.

Dr. Robock (speaking for the graduate schools)

See attached paper.

Dr. Carroll, Chairman, remarked that at Wharton, where there were many students from the LDCs, the most popular course was in Venture Development, which he adduced as an indication of the transferability of what they taught.

QUESTIONS/COMMENTS FROM THE FLOOR

1. Since skills needed by LDCs are best developed by working with multinational corporations, why don't the MNCs use the training facilities of U.S. universities instead of providing their own training?

   Ryan: Many companies don't believe that universities can do the job. MNCs view themselves as so unique and specific that no one else can train for them.

2. Why do American firms compete so poorly in foreign trade?

   Robock: The export trade is not a big enough component of trade in the U.S. to warrant great attention, as opposed to export-oriented countries such as Switzerland. No export manager ever got to be president of his company.

Carroll: Poor language preparation. Thunderbird does a good job, as do UCLA and Wharton, which combine the MBA program with international relations and a language requirement. He cited a remark by Hayakawa to the effect that what did people expect in U.S.-Japanese trade relations when there were thousands of Japanese running around New York alone speaking English while there were virtually no American salesmen in Japan speaking Japanese.

3. Byers speculated on the hundreds of thousands of foreign students that might appear on our educational shores some years hence if we did not help to develop institutions overseas. What is our responsibility?

Panel: Was noncommittal. Carroll noted that tuition fees would have to be right to lull the taxpayers, but that the foreign students would be coming as American enrollments continue to decline.

BUSINESS ADMINISTRATION CURRICULUM: U.S. CAPACITIES, DEVELOPING COUNTRIES' NEEDS

by Stefan H. Robock

As a reflection of the industrialization success of the developing countries, training in business administration has been receiving increased attention as a field of professional study. With assistance from such groups as USAID and the Ford Foundation, an impressive number of schools of business administration have been started in the developing countries within the last two decades in such countries as Brazil, Peru, Venezuela, India, Pakistan, and Bangladesh. In addition, a small but growing number of graduate students and managers have been coming to the United States for training.

This growing interest in management training raises the question before this panel of the relevance of the regular curricular offerings in graduate business schools for students from the developing countries, and the extent to which special programs are being offered. The question of special programs has been tentatively answered by a survey of 25 graduate business schools conducted by the Institute of International Education, and the answer is that very little in the nature of special programs is being offered. Of the special programs identified, one is for Japanese middle-level managers -- which would not qualify as training for students from developing nations. Another is a 12-month course for middle managers. A third special program combines MBA training with Latin American studies. The one that most clearly qualifies is at Syracuse University and contains courses "specifically designed for specific foreign national customer groups."

The response was somewhat better to the query as to special courses in the regular curriculum rather than special programs specifically addressed to the concerns of the developing countries. A number of schools offer courses in development economics, economic planning, and various aspects of international trade and business operations that are highly relevant for developing countries.

Clearly, American graduate business schools have not given high priority to developing special programs for students from developing countries or to shaping the regular curriculum in this direction. The courses in development economics and international business are very valuable for future managers in developing countries, but the stimulus for these courses was a perceived need for U.S. students to secure training in these areas, rather than a response to students from developing nations.

Stefan H. Robock is Robert D. Calkins Professor of International Business, Graduate School of Business, Columbia University.

A second reason, the pressure of competing demands, is related to the first. Most business schools are under pressure to expand their training in new areas such as public sector management and international business. With limited resources, which activities are to receive priority?

A third factor is that most of the conceptual, institutional and empirical information needed to design special programs has not yet been developed. Research on management issues has only recently started in Western Europe and Japan, and very little is being undertaken in the developing countries. Management training has been an American invention, and research is produced where the academic institutions are located. To be brutally frank, I should recognize that U.S. researchers could be doing more research relevant to the developed countries. But such research is not in fashion these days, in large part because it will not produce the types of publications in refereed journals that earn tenure.

But the picture is not as grim as these comments might suggest. The emphasis of the survey was on special programs and special courses. The question still remains as to how relevant the <u>regular</u> curriculum is for the needs of managers from developing areas. As one university emphasized in responding to the IIE survey, "the main thrust of the curriculum is to develop management skills and analytical ability to deal effectively with a variety of problems. A student from a developing country would gain the most proficiency in the administrative process..."

In other words, if business schools are successful in their goal of developing managerial skills in analysis, problem-solving and decision-making, the general experience of graduate training in U.S. business schools has great applicability to the developing nations. This possibility is confirmed by the IIE survey of U.S. Cultural Affairs Officers abroad, who reported that U.S.-trained graduates are "especially valued for their practical bent and highly developed problem solving skills." This statement, however, applied to all graduates, not uniquely to those in business administration.

At the same time, it should be noted that less than half of the foreign students surveyed rated management education in the United States as excellent preparation for a professional career in their home country. Also, the disciplines most often mentioned as too advanced for practical use were economics and business.

This suggests to me that the training in decision-making and problem solving is relevant but that instructional materials on institutional settings and on many techniques, particularly the sophisticated quantitative techniques, are not so relevant.

Let me be more specific, based on my own experience working in developing countries. Take the field of marketing research. Marketing research managers operating in the United States and other industrialized countries have large amounts of high-quality data that lends themselves to analysis with sophisticated tools. The main

problem in most developing nations is the paucity and variable quality of data. The challenge to the market researcher is largely one of getting information for analysis with simple tools.

Or take the area of business finance, where the institutional settings of the developing countries contrast sharply with those in the advanced countries. In the developing countries, capital markets -- and particularly equity markets -- are poorly developed. Investment banking usually does not exist, and government financing agencies are frequently the principal source of investment financing. In addition, many of the developing countries regularly experience hyper-inflation at annual rates of 50, 100 per cent and higher. Obviously, financial management problems are different and require different tools. And the contrasts can be continued for many other curriculum subjects, such as accounting and labor relations.

The bottom line, as business professors are prone to say, is that graduate business schools are serving many markets and that the less developing countries are a small (or minor) market that is being served only reasonably well. This is the same issue as the appropriate technology question.

Now, suppose that the developing-countries market was given a higher priority and that resources were available for providing more relevant training for students from developing countries. How should these resources be allocated? What share should be focused on improving the regular curriculum of schools in the United States? What share should be allocated to developing special programs? And what share should go to improving training facilities in the home countries? Of course, the answer is not an "either-or," because actions can be taken on several fronts.

My recommendation would be to give first priority to development assistance for improving training facilities in the developing countries. The advantages of this approach are many. The costs per student would be much lower than for a program of overseas training, and large numbers of students could have access to such training. The language problem for the students would be greatly reduced, even though some of the materials may have to be in English. The cultural adjustment problem of foreign study would be reduced, and bases would be established for developing more appropriate materials. Where all the students are expected to manage in a specific country environment, the curriculum and the materials can be tailored to that environment.

From the standpoint of the U.S. business schools, such overseas projects have had valuable feedback by educating U.S. academics on the special problems and institutions involved in business management in developing countries. This experience and knowledge, in turn, has feedback into the U.S. curriculum in many cases.

Insofar as resources and higher priorities are directed toward enlarging the contribution training in U.S. graduate programs I would recommend that the trend toward developing international business

courses be continued. Also, I would recommend more emphasis on international trade in the form of importing and exporting. Still another direction would be an expansion of comparative courses in such areas as management, accounting and labor relations. All of these approaches would be of value to foreign as well as domestic students.

If special programs are expanded in the United States for students in management from developing countries, I would like to see a concentration of efforts by a small number of selected schools. The objective would be to get a large enough student body in one institution to warrant giving their needs top priority.

Still another aspect of management training is through executive programs for international and foreign managers. We at Columbia have had considerable experience and good success in this area.

PANEL 4: HEALTH CARE PROFESSIONS (ALLIED HEALTH FIELDS, MEDICINE, NURSING AND PUBLIC HEALTH)

Chairperson:
Raymond Casterline, Executive Director
Educational Commission for Foreign Medical Graduates

Panel:
Leonard Fenninger, Group Vice President
for Medical Education
American Medical Association

Beulah Ashbrook, Director of Education
American Society of Allied Health Professions

Virginia Ohlson, Professor and Head
Department of Public Health Nursing
University of Illinois

Dennis Carlson, Associate Professor
International Health
Johns Hopkins University

Rapporteur:
Blanche Anderson
American Association of State Colleges
and Universities

SUMMARY

General themes emerged as follows:

In the case of physicians, progress can be seen as a result of the Health Professions Educational Assistance Act of 1976 (PL 94-484). This law mandates an agreement on the part of the government of the country of the alien physician to specify that there is a need in the home country for the specialty in which the physician-trainee will receive training in the United States. Furthermore, the alien exchange visitor must leave the United States at the termination of the training program, which at present is limited to no more than three years.

The advisability of a similar requirement should be considered for all LDC applicants for U.S. training in all the health fields. Such an approach bears on the problem of developing programs specifically geared to LDC needs as well as matching LDC student needs with existing

U.S. programs that are relevant to those needs.

Among the obstacles to presenting courses relevant to LDC students' needs is the lack of U.S. sensitivity to, and knowledge of, the cultures, taboos, social structures, and political situations of LDC students' home countries. The panel did not provide suggestions on how to solve this problem.

Dr. Dennis Carlson stressed that curricula should emphasize "learning to learn" rather than information per se, which may not be transferable to an LDC and which also may be rapidly outdated. Dr. Carlson also stressed the importance of recognizing the value to LDC students of learning from peers and of practical experiences. Specific recognition of these facts would reduce the U.S. tendency to "pack the curriculum."

Almost all panel members stressed the difficulty of increasing the numbers of LDC students in health fields because of restrictions inherent in the way education in these professions is funded in the United States.

The fields of study considered most relevant are:

Allied Health

1. Medical Technolgoy
2. Physical Therapy
3. Radiology

Graduate Nursing

1. Primary Care
2. Public Health
3. Midwifery

ALLIED HEALTH EDUCATION AND ITS RELEVANCE FOR THE DEVELOPING COUNTRIES

by Beulah M. Ashbrook

Because "allied health" is a concept that often isn't clearly understood, I will attempt to define the term. The National Commission on Allied Health Education has defined the allied health occupations as follows: "Health personnel working toward the common goal of the best possible health services in patient care and health promotion."

Perhaps another way to define the allied-health occupations is by examining how they came into being. The occupations that are now classified as allied health began shortly after the beginning of this century, as non-physician specialists were trained to take and develop x-rays and to do much of the work involved in laboratory tests. Rehabilitation called for occupational and physical therapists and several other allied-health occupations. These allied health workers were not concerned with total patient care, as the physicans and nurses were. The allied-health workers were specialists. Their education and experience were concentrated in providing just one part of the services required by patients.

Since the middle of the 1960s, the specialties of this group of non-physician specialists have expanded in number from 25 to 200 allied health occupations, depending on which classification is used.

To illustrate how confusing this concept is, the Institute of International Education sent out questionnaires to 132 schools of allied health professions. Replies were received from 42 of these questionnaires. There were 38 different allied-health profession programs identified as being particularly relevant to the needs of the developing country students. There were 17 allied-health programs which, in the opinions of the respondents, were <u>not</u> relevant to the needs of developing-country students. Yet comparison of these two lists reveals five programs on both lists!

The programs which had the highest number of responses as being relevant for developing-country students were:

Medical Technology	20	Nutrition and Clinical Dietetics	9
Physical Therapy	20		
Radiologic Technology	12	Administrative and Health Services	9
Respiratory Therapy	9	Nursing Education	7
Physician Assistants	9	Occupational Therapy	6
Medical Records Technology	6	Dental Hygiene	6

Beulah M. Ashbrook is Director of Education of the American Society of Allied Health Professions.

Of the 42 reporting institutions, only two reported that they had allied-health programs designed especially to meet the needs of students from developing countries. One had two such programs, and a third institution is in the process of developing such a program but currently has no foreign students enrolled.

Of these four programs, one is an advanced professional program for international students and is for qualified students who have done their basic training in allied-health fields in another country. A certificate of special study is awarded. No description was given of how this program was planned to meet the needs of foreign students. Another program, at another university, is in nursing. Both the the Associate of Arts in Nursing and the B.S. degree are granted. At this same university, a second program is offered, this one in radiologic technology. Both diagnostic radiologic technology and nuclear medicine are offered with two degree options -- the Associate of Science in Radiologic Technology and the B.S. degree. Both of these programs offer remedial courses for students having academic difficulties, especially in English and mathematics.

The third university is in the process of developing an allied-health careers specialty in the fields of x-ray, medical laboratory and respiratory therapy. An associate degree is planned for the program. The purpose of this program is to train multi-competent technicians at one-year competency in at least two of three fields. It is anticipated that these persons will be employed by small rural hospitals; hence this may be an appropriate program for students from the developing countries.

Only one of these schools, the second one described, has been in correspondence with the foreign countries concerning the development of their programs to meet the needs of the students from those countries.

As for what kinds of changes need to be made in the allied health curricula to meet the foreign-student needs, the responses from the questionnaire are as varied as the number of respondents. The responses ranged from, "Never have addressed this question"; "Nothing in particular... if...they qualify for our program they will be admitted" to "...We recognize the needs for this, but are not in a position to give it priority over our regular programs, which are struggling to survive"; and "...We would be willing to develop special curricula if we knew what had to be developed within our capabilities...It appears that primary care on a low educational level would appear to have priority, rather than sophisticated secondary and tertiary care trained personnel."

It is interesting that the university which has had themost involvement in programs for developing-country students had this to say: "Educate faculty regarding customs of students, proper interpretation of standard tests...ability to objectively evaluate students' achievements. As for the institution...exchange of faculty, offer tuition waivers and scholarships for students and provide counseling in the adaptation process of students."

It is this last response that I have found to be in agreement with the recommendations made by persons who have either taught in the allied health fields in a developing country or have had developing country students in their allied-health programs here in the United States. These persons identified the following problem areas as those which need to be considered in the planning of developing-country students in United States allied-health programs or in preparing faculty to go to developing countries to teach:

1. Cultural differences, especially in the area of evaluation of students, but also in the drawing of blood and in the protection by parents of their children who are being x-rayed.

2. Lack of problem-solving techniques. This seems to be a skill which is not emphasized in many of the educational systems.

3. Ethnic pride in wanting to use their own language or dialect. Often, too, the English language which is spoken has not been correlated with scientific English.

4. Female roles in scientific fields in many countries are not equivalent to the female roles in scientific fields in the United States. This also affects the acceptance of females in scientific professions by members of the developing-country community.

Perhaps with this awareness of what the problems are, and where we are in dealing with the problem areas, we can begin to work towards satisfactory solutions.

GRADUATE NURSING EDUCATION AND THE
DEVELOPING COUNTRIES
by Virginia M. Ohlson

(Excerpts from a somewhat longer paper)

I. U.S. Graduate Education in Nursing - What Is It?

When one speaks of graduate education in nursing, a clear distinction must be made between a program of study which leads to the master's or higher degree in nursing and special non-degree or baccalaureate programs of study for graduate nurses whose basic nursing education was in a community or junior college leading to an associate degree, or in a hospital school of nursing leading to a diploma.

Doctoral programs for nurses established in Departments of Nursing Education in colleges and universities are of two types: (1) those that offer majors in nursing and lead to a Ph.D. in Nursing or a Doctor of Nursing Science, and (2) those that offer majors in related fields, as education, and sociology. Additionally, many nurses are engaged in doctoral study in fields outside of nursing, e.g., education, anthropology, psychology, and public health. Nurses who complete doctoral programs usually assume positions in research, as administrators or teachers, or in health care institutions or agencies. In 1977-78 there were 16 doctoral programs in departments of nursing education in the U.S.

Currently in the United States we have approximately 120 nursing programs leading to the master's degree. Although titles vary, they can be described catagorically as programs in advanced clinical practice in nursing (such as medical-surgical nursing, maternal and child nursing, psychiatric-mental nursing and public health/community health nursing), and/or as programs which prepare graduates for teaching positions in schools of nursing or for supervisory or administrative positions.

II. U.S. Graduate Curriculum Potential for LDC Students

In 1978 a questionnaire was mailed by IIE to 117 schools and colleges in the U.S. which offer graduate programs in nursing; 69 schools, or about 60 per cent, responded. These respondents indicate that graduate programs in nursing do not have special courses of study specifically designed to meet the needs of the international student or the student from LDCs. One school of nursing, Emory in Atlanta, does have a specially designed program for international students. It is, however, a certificate program, not a graduate program.

However, practically all 69 identified courses or programs of study that could be considered particularly adaptable to the needs of the international student. These were in the areas of:

Virginia M. Ohlson is head of the Department of Public Health Nursing of the University of Illinois at the Medical Center, Chicago.

Primary Care

Nurse Practitioner Preparation

Community Health or Public Health Nursing

Maternal and Child Health Care or Nurse Midwifery or

Medical Surgical Nursing

or in the functional areas of

Teacher preparation or

Nursing Service Administration in Institutional settings or

Health Care Administration in extra hospital or community settings.

Responses indicated that nurse educators view the master's degree program of their schools as highly relevant to the needs of students from developing areas. One respondent indicated that, since master's education in nursing is directed towards leadership, research and consultation skills, all curriculum offerings of the master's degree program would be relevant to the needs of LDC students of nursing. Emphasis was placed on the relevance of sequences of study which emphasize advanced preparation in clinical fields; in epidemiology, community health, and the preventive/health-promotion aspects of care; in nurse practitioner and nurse midwifery preparation and in programs of study in research in teacher preparation, and in nursing service administration and programs of health planning for communities and population groups at risk in the community.

The data showed that the student from developing countries, as well as any international student, would qualify for earning the master's or doctoral degree in most, if not all, U.S. graduate nursing provided he/she could meet (1) the admission standards of the university or college and of its graduate program of nursing and (2) the requirements for graduation. It must be recognized, however, that some schools of nursing are more amenable to enrolling international students than are others. This is particularly true where rigorous enrollment quotas are placed upon the institution because of restricted funds in state budgets in higher education.

Foreign-student admission requirements are fairly standard:

(1) Completion of the baccalaureate or masters degree in nursing from an accredited or approved school of nursing in the student's country.

(2) A grade point average compatible with the school's standards of admission.

(3) An acceptable TOEFL score - 500, 550 or better. Some schools also require the GRE and sometimes the Miller Analogy test.

It is of interest to note the responses,or lack of responses, from the 69 schools in regard to the question, "What, if anything, do you think your school should do to modify or revise the curriculum to meet the special needs of students from developing countries?"

17 schools did not respond to the question.

16 schools felt they are meeting the needs already OR should make a special effort to do so.

2 were willing to make adjustments should the need to do so arise.

5 indicated no concern to do so -

2 of the 5 stated they would not make changes since, as state institutions, their enrollments were limited and therefore the education of international students could not be within their mission.

2 of the 5 indicated a concern that not every graduate school need make curriculum changes to meet the needs of the LDC students, and that those schools without faculty versed in the culture and technology of the developing country should not attempt to do so.

1 of the 5 indicated it felt that larger metropolitan schools would be more attractive to the international student and that it, therefore, would not aim to recruit the students from LDCs.

III. Some of My Own Basic Concerns

I would like to share a few concerns I have regarding U.S. educational experiences for nurses from developing countries as well as from countries where nursing education is developing. (And I guess I have to admit that nursing education is still largely in the state of developing in the U.S.)

1. Low priority has been given by many countries to graduate pre-preparation for nurses. In many countries, little opportunity exists for nurses to study in other countries, even though programs of graduate study in nursing are not available within the country and the need for leadership roles in nursing is recognized and expounded.

2. As nursing educational programs are planned and initiated in colleges and universities in the Middle East, in the African countries and in the Asian countries, nursing faculty prepared at the masters (and doctoral) level are not available for appointment to faculty positions. Frequently, therefore, these positions have been filled by individuals from other

disciplines who become the teachers of nurses but not the teachers of nursing.

3. Experience has shown that it is not profitable for nurses from foreign schools of nursing to come to the U.S. to earn the baccalaureate degree. It is highly advisable that nurses earn the baccalaureate degree in their own country before seeking graduate education out of the country.

4. Too often nurses who come to the United States from developing countries (or from countries where nursing is developing) have been granted study leaves only of six months to one year in duration. In such short periods they cannot complete requirements for the master's degree and therefore frequently have been admitted to the nursing program as "special non-degree students". In my opinion, we do these students a great disservice. On returning to their countries without university-degree credentials, they do not qualify for faculty appointments in the university school. Should they desire to return to the U.S. later for further academic work, they are unable to build upon the past educational experience in accruing credits for a degree.

5. Nurses who come to the U.S. for graduate study as a rule have been selected because they are potential leaders. If their study in the U.S. is underwritten by government funds or by funds from the sending institution, they usually have a rather clear notion of the position to which they will be appointed at the termination of their studies. It is extremely important that their educational experience in the United States assist them in achieving their career goals. Even though the U.S. college of nursing does not have a specially designed support system for the international student, entry - on-going and exit experiences for these students must be anticipated and planned.

6. I've had the privilege of a seven-year work experience in the Orient - five years as a nurse educator and consultant with the U.S. government, and two years with the Rockefeller Foundation. I recall the account of an experienced Japanese nurse educator who came for a year of study in the U.S. in one of our eminent universities. She came here anxious to share and have some feedback on the curriculum plans which had been drawn up by her and her faculty in a newly developing university school of nursing. She was enthusiastic about them and shared them with me before leaving for the U.S. When she returned to Japan, I said to her, "What did the faculty at X University think about your curriculum plans?" She said, "I was never given a chance to unroll them."

I was sorry to hear this! As U.S. educators we must remember that we can be of assistance to students from foreign countries only when we let them share with us their ideas, their work, their goals, their problems and concerns, and their ways of arriving at solutions. Often we will find that we will learn much more than we will teach!

PANEL 5: AGRICULTURE

Chairperson:
Russell Stevenson, Secretary-Treasurer
Agricultural Development Council

Panel:
Ronald Heisner, Instructor
Agro-Business
Kishwaukee College
Malta, Illinois

Janet Poley, Assistant Deputy Director
for International Training
U.S. Department of Agriculture

Harold Riley, Chairman
Department of Agricultural Economics
Michigan State University

Thomas Wickham
Wickhamb Fruit Farm
Cutchogue, Long Island

L. W. Zuidema, Assistant Director
International Agricultural Programs
Cornell University

Rapporteur:
Margaret Fahs
National Association of State Universities
and Land-Grant Colleges

SUMMARY

Major recommendations:

1. Greater recognition is needed of the importance of agriculture to development in LDCs and the need for U.S. institutions to assist in training in this field.

2. Training is important not only in production of agricultural commodities, i.e. food, fibers, etc., but equally in administration and management of agricultural systems.

3. Many types of training are required. Some examples are:

a. conventional graduate training in agriculture disciplines (both in the United States and the LDCs) in agronomy, agricultural economics, agricultural engineering, etc.

b. training in administration and management, both degree and non-degree.

c. short-term practical training, such as that offered at technical schools and community colleges.

d. training in related social science fields, such as communications, sociology, political science, and extension.

4. All panel members placed strong emphasis on the need for training across disciplines. This is especially vital to foreign students. Their complex development problems cannot be understood through a single lens.

5. Beyond course or program content, U.S. colleges and universities must try to develop in their students the capacity to think analytically, to make judgments, and to solve problems in the local situations.

6. It is important to recruit more women for training in agriculture programs, to meet the special training needs of women as well as to overcome our own biases and male-oriented misconceptions regarding the role of women.

7. It is important that universities understand how large the number of foreign students coming to the United States is and how high a proportion receive support from their own governments or their families, in considering the need to be flexible in designing programs that meet these students' home-country needs.

8. Collaboration between U.S. universities and LDC universities is important. For example, joint degree programs could be worked out, involving courses and/or research both in the United States and at home.

9. There was uniform agreement on the value of having LDC graduate students in agriculture conduct their thesis research at home on relevant problems.

10. We should devise ways to maintain linkages with foreign students after their return home. Possibilities include later research collaboration, consultancies, visiting professorships, sharing materials and reports, short visits, etc.

11. Funding is needed to permit more exchanges among U.S. and LDC institutions for joint research, at both the student and faculty level.

12. Many of the above recommendations (joint programs, professional exchanges, special curriculum arrangements) will require additional funding. The panel urges the U.S. government, universities, and development agencies to increase their allocation of funds for such purposes.

THE COMMUNITY COLLEGE - AN INTERNATIONAL INSTITUTION

by Ron Heisner

(Excerpts from a somewhat longer paper)

1. No nation has ever successfully become a developed nation without first attending to its agriculture. Agriculture is basic even if it recedes relative to other industries later.

2. Most of the people in developing nations are directly involved in agriculture. Agriculture is where the majority of the people are.

3. The problems in agriculture for Third and Fourth World nations are more likely to be problems of people development rather than problems of food production. If we are going to assist developing nations, we need to do more than just help them produce more food.

4. Most of the developing nations are two-class societies, a small rich upper class and a larger, poor lower class.

5. Most of the people who are agriculturally oriented are not educated. Most of those who are educated are not agriculturally oriented, have not grown up on farms.

The concept of a community college has much to offer developing nations. More and more people are accepting this idea. The very core of the community college is that of being community based.

Community college student populations include a large proportion of people not previously found in postsecondary education. They include people who may not have finished high school as well as college dropouts, people who are unemployed or in obsolete jobs; women in the community, including young mothers with children at home; senior citizens. The effects of serving these populations include a rising age level a higher proportion of students from lower socio-economic levels, and large numbers of part-time students.

This variation can lead to some very challenging teaching situations. Consequently, teaching competence is highly valued. Research is <u>not</u> part of the normal teaching workload.

Community College programs and instruction are performance based. Diagnostic measures help students establish justifiable beginning points and completion points for designated units of work. People are expected to move into and out of the institution as needs and opportunities present themselves.

Admittedly, this type of institution lends itself best to a developed society, but with a minimal amount of tailoring this same

---

Ron Heisner is Agricultural Instructor at Kishwaukee College, Malta, Illinois.

type of institution could fit into a developing nation. How can a developing nation best understand how a community college operates and conducts itself day to day? One way would be to have some of its students attend a community college. And that is just what is happening increasingly.

A more basic reason developing nations are sending students to community colleges is much less subtle. The community colleges offer two-year career programs. These programs de-emphasize general education, so that time-wise they can concentrate on necessary job skills. They are designed to prepare people for mid-level management and technical careers. Four or five agricultural technicians can be trained in the amount of time it takes to educate one doctoral student. Furthermore, most of these technically trained people go back home. Many highly educated doctoral students elect not to return.

Developing nations need a balanced work force such as we have here in the United States. But that balance involves many more trained technicians than it does highly educated specialists. LDCs do not yet have the personnel, facilities, or institutions to develop this mid-level technical manpower. The U.S. community college can help fill this gap.

Are the community colleges ready to assume this role? The very fact that these institutions are community based often prevents them from even considering a role in international education. But some have a broader concept of the community they serve.

Consider Kishwaukee College, for example. It is a rural, land-locked institution serving a prosperous agricultural and business community in north-central Illinois. Among the foreign student population is a group of 25 students from Nigeria studying agricultural mechanization. How is Kishwaukee better off for having taken responsibility for these students?

1. They provide a more diverse agricultural student body. They bring first-hand the ideas and perceptions of people from a less-developed nation and allow Kish's native students to see how they think and live. The world problems of hunger and development are less abstract.

2. These Nigerian students will see average Americans in their natural setting, in their communities, on their farms.

3. The American students have shown more interest in international travel and service such as with the U.S. Peace Corps.

4. Perhaps the most powerful advantage, however, concerns world commerce. Illinois leads the nation in the production and export of agricultural commodities. Developing nations show the most potential for growth in demand of agricultural products. As

nations like Nigeria develop, their population will demand improved diets.

This last advantage needs some explanation. On the surface, it appears we are enhancing our own competition. But, remember, agriculture is where the people are. Agriculture must be developed first. The rest of the economy can then follow. At the end of World War II, we pumped high amounts of foreign aid into Europe and Japan. Both are now two of our largest agricultural trading partners. In the long run, we are helping to build a foreign economy, establishing personal contacts, and developing agricultural personnel who can interface with foreign people. These are not immediate results, but the drift is in these directions.

International Agriculture: Challenging Opportunities, by Warnken, Ragsdale, and Flaim, University of Missouri, point out the increasing need for U.S. international agriculturalists. If U.S. community colleges are preparing students for existing careers, they are doing their job. If the training done on college campuses enhances the livelihood of the citizens of their communities, they are doing their job. Agriculture is in the international community.

Answering the question of "Why Community Colleges should be involved in International Education" is tough enough. How can they properly get involved is a much tougher question. Again, our experience at Kishwaukee College may be helpful.

Our Board of Trustees has consistently maintained that international education of foreign students is within the proper thrust of our college, provided we do not detract from the educational progress of our native students and that we do not consume local tax revenues in their education. The Illinois Community College Board has also indicated that we should not consume state educational funds. Each year the ICCB runs an audit of costs for all community colleges. It even breaks it down on a per-student basis per institution. We use this figure to compute our tuition for international students. The foreign students pay their own way as far as the college, community, and state are concerned. This has defused most local opposition to having foreign students on campus. When international students bring the advantages they do to our campus at no local or state cost, it's tough to oppose their presence. However, the tuition cost is not very attractive.

Several alternatives exist for meeting this tuition cost:

1. The country from which the student comes and to which the student will return may pay the tuition. Nigeria is using oil revenues to do this in the case of the Nigerian Manpower Project students on our campus.

2. The students or their families provide their own financing, as is the case of many of our other international students.

Clearly, both these alternatives are limited to nations and individuals with financial wherewithal. The truly poor nations and people are kept out unless other alternatives are found. Additional alternatives include:

3. U.S. Federal scholarships may be given by the various agencies dealing in U.S. foreign aid.

4. Private foundations may allocate scholarships.

5. The state of Illinois may develop a scholarship fund apart from its usual educational appropriations. If our state is to benefit from having international students, perhaps it should carry at least part of the financial weight, but not at the expense of the regular educational program.

6. Local civic organizations, church groups, etc., may wish to establish scholarships.

These last four alternatives assume a commitment to international education. They assume large groups of people believe foreign students on U.S. college campuses are good and beneficial to their interests. I do not believe we are yet to this point, but do feel that community colleges are very close to America's heartland. The more heavily our local citizens are involved as individuals with individual foreign students, the more personal will become that commitment.

We are being given an opportunity to test this hypothesis. The Nigerian Government approached our State Department two years ago with a request to technically train 10,000 young Nigerians. Over 120 U.S. community colleges are now involved with this project. It is funded by the Nigerian Government through the Agency for International Development (AID) Office of Reimbursable Development Programs. Approximately 1,000 new students per year will enter the country as 1,000 trained students leave the country. The first cycle will be completed next summer.

As I stated before, Kishwaukee College is training 25 in agricultural mechanization. They will receive two years of intensive, hands-on training, including 24 weeks of supervised occupational experience. This will take place in our local implement dealerships, farm shops, and farms. The community has been and will be even more heavily involved as the project continues. The whole experience has been very challenging for us on the staff, but our reactions have been positive. Our community has given us the support we expected.

AID has been a catalytic force that has allowed over 120 community colleges to take part across the entire nation. They screened the students for us, handled visas, passports, and other paper barriers. They are handling and disbursing funds, making medical arrangements, and handling over-all problems as they crop up. In short, they are allowing us as community college educators to do what we are best at doing; namely, educating and training students. I serve as their local liaison and, as yet, have not

had to give up my teaching or other functions at Kishwaukee. My liaison role is compensated on an over-load basis.

I strongly feel that if community colleges, especially the smaller rural ones, are going to be involved in international education, a model such as the one established by the Nigerian Manpower Project will need to be followed.

Finally, we need to explore areas in which the community colleges and agricultural universities can cooperate in the area of international education. The guiding principle should be that each institution does what it does best and continues doing it even for international students. Their needs may be somewhat different than those of our native students, and this needs to be recognized, but we will likely be more successful building upon proven, successful programs than developing new programs from scratch.

Several on-going cooperative efforts in Illinois can illustrate this principle. Community colleges that teach agriculture, the U.S. Peace Corps, and the four universities that teach agriculture have a rather loose, on-going relationship. Graduates of two-year ag programs, if otherwise qualified, are able to volunteer for Peace Corps service. Either before they leave or while they are overseas, they can enroll in one of the four-year universities. When they return, they may receive some college credit for their Peace Corps experience and complete their baccalaureate degree. If they are a graduate of a career program that was not designed to be transferrable, they may enter what Southern Illinois University refers to as its "Capstone Program." The Capstone Program allows two years of credit for a technical degree and then requires the general education requirements be met during the last two years. A Bachelor of Science degree is granted at the successful completion of this program. Combining a technical degree with its supervised experience, overseas Peace Corps experience, general education to provide a Capstone plus B.S. degree, establishes for the student a favorable set of credentials. Representatives of Deere and Company felt that if the right student started in ag mechanics and completely followed through on this program, he would be very useful to them. They stated, "We couls use 5,500 of such graduates in the next ten years." The University of Illinois has a similar technically based program to develop agriculture teachers. The degree, again, is a B.S. degree.

Several of our Nigerian students have indicated a strong interest in following such a program. They would have two years of technical ag mechanics plus supervised occupational experience, return and work in Nigeria for two years, and then complete a Capstone Program. Perhaps such a program should be differentiated from a traditional B.S. type program and be called a Bachelor of Applied Science (BAS) degree. A cooperative approach to education such as this could be very useful to developing nations.

A second cooperative project between community colleges and an agricultural university in Illinois is just in its embryonic stages, but it shows much promise. A technical agriculture college in Kenya has requested U.S. assistance in developing its programs, facilities, and faculty. A consortium of midwestern universities has been identified. The Illinois university is requesting the cooperation of three selected community colleges including Kishwaukee. The major advantages of this type of arrangement are:

1. Such an approach allows for long-term commitment to a given country or region. While there are some similarities between developing nations, each is different. Different consortia can concentrate their efforts on different regions or nations.

2. Articulation between community college programs and university programs can be more effective for the foreign student when joined in these types of arrangements. The B.A.S. type of degree is more probable.

3. While community colleges have much experience with community-based (and community building) education, they are not generally in a position to provide leadership for this type of project. They are primarily teaching institutions.

4. While universities with agricultural and graduate colleges may have the resources to undertake such a project, most lack experience in community-based education and most lack experience with two-year career or technical programs.

5. More resources, communities, staff, and people are joined in a common, directed, long-term effort. Each institution can continue to do what it is best at doing.

We don't know how this last approach will work out. That chapter is yet to be written. At Kishwaukee College we are proud of our short past and are confidently facing the future. In Illinois we recognize our leadership in agriculture and world agricultural commerce. We are not selfish in sharing what we have, but want to share in ways that are effective.

CURRICULUM: U.S. CAPACITIES, DEVELOPING COUNTRIES' NEEDS IN AGRICULTURE

by Janet Poley

Introduction

The International Training Division of the Office of International Cooperation and Development is a small interdisciplinary unit located in the Department of Agriculture. Our primary purpose is the coordination of the participant training program for AID- and UN-sponsored students in agriculture. In this capacity, we work on a nationwide basis with universities and the private sector in the design, implementation and monitoring of academic and nonacademic training for AID- and UN-sponsored students from developing countries.

Our staff are professionals with developing-country experience and academic backgrounds in a variety of agricultural disciplines, as well as in education, management, sociology, and communications. I am currently serving as Assistant Deputy Director of OICD for International Training, and my own background is mixed, with degrees in communications, nutrition, and adult education. I spent 10 years at the University of Nebraska-Lincoln as a professor of agricultural communications before joining USDA three years ago.

In addressing the topic at hand, I would prefer to begin with the question of training needs in LDCs and move from there to graduate training programs we are aware of and opportunities for new and/or modified programs.

Training Needs in LDCs

First, let me say that I found Richard Myer's report most interesting and in many respects encouraging with respect to the agricultural training currently being offered to foreign students. It also raised some interesting questions with respect to what we as agricultural educators are doing intentionally and perhaps unintentionally with respect to training foreign students in agriculture.

With respect to LDC training needs in agriculture, I would like to address the issue from a content and process point of view. It is my own personal view that much of the U.S. agricultural curricula is built upon content objectives related to teaching students to master a specific body of subject matter in an area of agriculture. We intentionally set up each of the courses we offer with a view toward content mastery of a piece of that particular body of knowledge. We unintentionally, or at least less intentionally, in our curriculum development efforts, hope to provide students with the process equipment to think, act, and continue to grow once they leave school.

Janet Poley is Assistant Deputy Director, International Training Division, Office of International Cooperation and Development, U.S. Department of Agriculture.

(The views expressed in this paper are those of the author alone.)

My own experience and the needs-assessment activity conducted in ITD would lead me to believe that the following process skills are very important in helping to develop LDC students who can return home and participate effectively in development:

1. Ability to think analytically,

2. Ability to plan and manage,
set goals and priorities,
make choices and decisions, and
solve problems

3. Ability to think creatively and flexibly (related to ability to manage) to generate new alternatives and to adapt and adjust learning to fit the existing situation.

4. Ability to communicate sensitively with many kinds of people in many situations.

5. Ability to act upon knowledge and feelings.

6. Ability to transfer one's own knowledge and skills to others.

In addition, I feel that development self-confidence and self-reliance in the LDC students with whom we work is very important.

On an annual basis ITD conducts a training needs survey of all AID Missions and FAO project officers. These individuals are to discuss with country officials the training needs they see as highest priority for development. The results over the past three years would strongly support the list of skills above.

While I think no one would argue that we should not train technically competent agriculturists, perhaps more attention should be given to intentionally trying to develop some of these process skills. I hold the view that both are necessary. An individual can be an excellent soil scientist, but in the developing-country setting he may be effective only if he has the process skills to allow him to practice as a soil scientist.

I also hold the view that you can't develop another person: you can only set the conditions for this to happen. With respect to LDC training needs, I suggest that we examine our agricultural curricula with a view to trying intentionally to create conditions that will help LDC students function effectively in both process and content areas.

Myer's report would indicate that according to the response of Cultural Affairs Officers, we are already doing some of this well. They say U.S. graduates are especially valued for their practical bent and highly developed problem-solving skills. My question is in terms of the need. Can we do more intentionally in agricultural curriulum to develop process-learning-oriented conditions?

Graduate Training Programs for LDC Students

OICD/ITD works with many schools and the private sector with respect to training. We are aware of some excellent programs in many agricultural subject matter fields in institutions in many parts of the country, both large and small institutions. And of course, I am speaking here in generalities, all the while recognizing that each student coming to the United States to study is an individual with a different home-country background and during his/her stay in the U.S. each student is encountering distinct individuals.

While I think there are many possibilities for modifying existing graduate training programs in agriculture and creating new opportunities, particularly in the process areas, I would argue that perhaps the biggest change necessary, in general, is increased institutional flexibility. (Incidentally, I think this true in terms of dealing with our U.S. students, as well as those from LDCs.) After all, our disciplines and curriculum are all man made. Are all the prerequisites we prescribe necessary for all people? Can graduate programs be tailored more to fit individual and home country needs? (Incidentally, I believe that some of the problems of LDC perceptions relative to the "watered down degree" are of our own making. We communicate to both U.S. and LDC students that if you follow something other than the established curriculum it will result in your being an inferior professional.) Perhaps more innovativeness and creativity in our graduate programs would result in superior professionals more capable of seeking out solutions to the problems of tomorrow.

As many others in the field have suggested over the past several years, allowing students to take more courses outside their major field of study and conducting research on home country problems should not be all that difficult to institute. In addition, I think there are strong faculty in-service training needs indicated. While I think there has been a growing interest on the part of U.S. institutions in participating in international development and in increasing capability to respond to the needs, I think there are even more resources that can be brought into the configuration. I particularly believe that more process-oriented in-service training opportunities could be instituted for U.S. faculty, more internationally focused seminars and workshops, and more inter-disciplinary efforts.

Women in Development

I do not think we can overlook at least a brief discussion of sex roles as related to agricultural curriculum development for LDC students. Last year, of the AID- and FAO-sponsored students in agriculture programmed by our office, approximately 10 per cent were women. I firmly believe that we must design development projects with an understanding of women's role in development, that we need to recruit more women for training programs in agriculture and that we need to develop programs to meet the special training needs of women. However, I also believe that we should examine our U.S. agricultural curriculum in respect to what we are teaching men about sex roles. I believe that the re-education of men in this area is as critical as is the education

of women. It is my view that our U.S. agricultural education unintentionally teaches many things about men's and women's roles in society. How can we sort out the biases and unintended consequences of our teaching, if we ourselves are unaware? I think there are exciting opportunities for development of new courses set in an international context in this area. I also think there is more we can do for the LDC women who are getting graduate degrees in agriculture in the United States with respect to special problems they are likely to encounter upon their return to their home countries.

Evaluation and Recommendations for Action

In way of summary and recommendations it is my view that:

International agricultural training as conducted by U.S. institutions has done a good job, that interest in developing our capacities to do more is growing and that there is certainly more we can do to build upon what we've already done.

1. I think we can more carefully examine the intended and unintended consequences of the curriculum we are teaching.

2. I think we can give increasing attention to the needs in the process areas that are critically important to an LDC student's performance back home (abilities to think analytically, plan and manage, think creatively and flexibly, communicate sensitively, act and transfer knowledge and skills). We know a considerable amount today about how to foster the development of these skills and should continue to address more attention to these processes in our agricultural curriculum and create linkages to persons in disciplines outside our own to help us develop new ways of identifying, defining and solving curriculum problems.

3. We should do everything we can in our agricultural education efforts to help foster the self-confidence and self-reliance of the LDC students with whom we work. I believe that the more graduate research that can be done on home country problems, the greater the chance for relevance, but also the greater the opportunity for helping to create a self-confident individual. Professor and student potentially are on a more equal, reciprocal footing, than if the LDC student is merely carrying out a piece of the major professor's research project.

4. In terms of institutional flexibility, I would argue for increased curriculum flexibility and more individually tailored programs. This may require an examination on our own part about attitudes concerning the "watered-down degree".

5. In terms of faculty in-service training, I believe there is much that could be done to broaden our own thinking and create improved curriculum and flexibility.

6. I think it is critical that faculties of agriculture examine the question of sex roles in terms of their own attitudes, the curriculum they teach, the possibility for curriculum additions in this area, and the unintended consequences of our own cultural biases in this area. In addition, I think there is considerably more we can do to recruit women trainees in agriculture, as well as to search for ways to meet the needs of the woman farm laborer, the backbone of society in many developing countries.

In summary, I would say that development is a people process. While our agricultural technologies and the improvement of our agricultural technologies are very important to human survival, I do not believe we can develop effective agricultural curriculum or teaching-learning systems without placing them in a people context. In examining the programs of many LDC graduate students studying in the United States, I get very concerned when I see a program including virtually nothing in the area of human development.

As I said earlier, you can't develop another person, you can only set up the conditions for it to happen. Hopefully, we will continue to search for ways to improve our academic conditions in ways that will benefit our LDC colleagues and ourselves as well. Learning is a lifelong process, and once we get that magic diploma for the most part we're on our own. Viewing the training we offer as a beginning, rather than an end in itself, may help us think through ways to improve what we're currently doing.

AGRICULTURAL ECONOMICS AND
DEVELOPING COUNTRY NEEDS
by Harold Riley

1. During the four-year period 1974-78, over 1,400 LDC students entered agricultural-economics graduate programs in 48 U.S. universities. This represented 31 per cent of the total graduate students entering these universities for postgraduate degrees in this field of study.

Approximately two-thirds were admitted at the master's level and one-third at the Ph.D. level. The number of new LDC students admitted annually to U.S. agricultural economics graduate programs has been relatively stable for the past several years. A higher proportion of the new students are now coming from Africa and the Middle East but in absolute terms the largest numbers continue to come from Asia and Latin America.[1]

2. In 1973-74 the International Committee of the American Agricultural Economics Association commissioned a series of papers on international training in agricultural economics. Regional seminars were held to discuss these papers, and a major program activity was devoted to this topic at the 1974 annual meeting of the professional association. The background papers and a set of recommendations were published by the Agricultural Development Council.[2] One of the recommendations was that the AAEA should undertake a survey "designed to find out what former graduate students are doing and to obtain an evaluation of their U.S. education."

3. In 1978, the AAEA International Committee obtained financial support for a study of needs and strategies for improving training of agricultural economists for work in international agricultural development. This study is now in progress. Mail questionnaires have been sent to some 2,200 LDC professionals who have had agricultural economics graduate training in U.S. universities over the past 15 years. Responses have been received from nearly 30 per cent of this alumni group, in spite of the difficulty of getting current addresses. The mail questionnaire is being supplemented by personal interviews with professional agricultural economists and their employers in twelve developing countries. The results of this study will be presented and discussed at the 1979 annual meeting of the AAEA and also at the meeting of the International Association of Agricultural Economists being held in Canada in September, 1979. Follow-up

---

Harold Riley is chairman of the Department of Agricultural Economics of Michigan State University.

---

[1] For additional details see forthcoming note by Dr. Russell Stevenson in May issue of the American Journal of Agricultural Economics, 1979.

[2] International Training in Agricultural Economic Development, edited by L. P. Shertz, A.R. Stevenson, and A. M. Weisblat, Agricultural Development Council, Inc., 1976, 118 pp.

seminars with international development agencies are also being planned.

4. Several observations and tentative conclusions that are emerging from the AAEA-sponsored studies are as follows:

a. In general, U.S. training has been very relevant to the work of the LDC professional agricultural economists. However, several respondents suggest that their training should have given them greater breadth of subject matter relevant to LDC problems, as well as more specific skills in project development and evaluation and in methodologies for collecting and analyzing primary data under LDC conditions.

b. Most alumni place a high value on future professional development through continuing contacts with U.S. colleagues, participation in post-doctoral study programs, short-courses, and joint research projects.

c. The need for postgraduate training and the desired linkages with U.S. universities varies significantly among countries and is related to the level of economic development, the number of trained professionals in the country, and the local capacity for in-country training. The trend is towards master's-level training at local universities, with continued Ph.D. training abroad for a few of the most able students.

d. There is interest in joint degree arrangements between U.S. and LDC universities, but there are different views on how this should be institutionalized.

e. Many respondents expressed disappointment over the lack of contacts initiated by the U.S. universities where they have obtained graduate degrees.

f. There is a recognized need for multidisciplinary approaches to problem-solving work that would link agricultural economists and other social scientists with the technical agricultural scientists.

SOME OBSERVATIONS ON UNIVERSITY-LEVEL TRAINING
FOR AGRICULTURAL SCIENCES IN DEVELOPING COUNTRIES
by T. Wickham

(Excerpted from a longer paper)

Training Needs

Some of the more pressing training needs appear to be:

1. Multi-disciplinary programs. Most universities require students to major in one field and to select minor fields which support the major in a rather direct way. Students selecting widely differing fields for major and minors generally must satisfy basic requirements in each, with few courses applied towards more than one field. This results in much longer coursework programs and disincentives for multi-disciplinary programs. But never have engineers needed to know more about the economic, social, and political feasibility of their designs. Production economists must know more about agricultural technologies. Plant breeders should better understand the specific environments for which they are breeding varieties. U.S. universities generally exacerbate this problem, because their departments function with very little interaction, either formal or personal. While specific agricultural technologies can best be mastered by highly-focused programs, agricultural development probably can not.

2. The issue of judgment. A consulting engineer is often called upon to look over a problem and, calling upon his years of experience, recommend a course of action. Very often his judgments, based on experience, are not - and even could not be - supported by deterministic methodologies. This is quite proper in many cases, but students are usually taught only the specific design techniques. It may not be possible to teach experience, but at least students should be prepared to make judgments where data are insufficient; to discriminate among competing options which cannot be ranked directly; to infer solutions where formulas are not available. There is very little in U.S.-based or developing-country training to prepare graduates for this kind of issue.

3. Management vs. design. Engineers are forever being trained to design irrigation dams, but who is being trained to manage the system? University-level training in agricultural engineering continues to overehmphasize design at the expense of management. Management is often a more complex problem than design, with greater interaction with other fields and the use of judgment. One of the reasons U.S.-based training has been slow to shift its emphasis to management is that design principles can usually be applied in one form or another in widely varying environments; they are relatively

---

T. Wickham, a Partner, Wickham's Fruit Farm, Cutchogue, L.I., N.Y., has had extensive experience in agricultural development.

universal. Many developing countries seek this kind of assistance from outside, but are not so eager for a Western institution to study the ongoing management (or exploitation) of its infrastructure.

4. Practical research opportunities. We have all seen how many graduate students' theses are carried out by students from overseas on problems with no significance to their countries. The best way to change this is to encourage the student to do his research in his own country. Arguments against this recommendation include the longer time required to get set up in a location far from the university, difficulty of adequate supervision, shortage of facilities, and increased cost. All these are true, but the rewards outweigh the difficulties for those students inclined to try it: easier and more direct practice of one's skills in a job after graduation, better understanding of the development issues facing a country and a discipline in that country, and broader exposure on the part of the university. Major expansion in the numbers of students doing their thesis research in their home countries cannot be expected, however, until the universities become willing to make limited grants of academic responsibility to others in the country who can help supervise the research. The funding problem is surmountable at present.

Recommendations and Conclusions

Recommendations for enhanced university-based training follow directly from the above discussion of issues. They include:

1. Need for greater flexibility in putting together academic programs at the coursework phase;

2. Explicit recognition of the role of judgment in technological decisions, and preparation of students to handle it;

3. Increased emphasis on management of systems, with preparation in fields such as social control, political theory, and many others;

4. Research opportunities for graduate students in their home countries. This would be strongly encouraged by grants of authority from universities to others in the field who may be in a better position to help guide the student.

U.S. CURRICULAR MODIFICATIONS FOR AGRICULTURALISTS FROM DEVELOPING COUNTRIES

by L. W. Zuidema

The study of agriculture in the United States and abroad has become a priority area of training for the LDCs. This perception of U.S. Cultural Affairs Officers and foreign alumni of U.S. universities was clearly documented in the IIE study report by Richard Myer. The continuing concern for adequate and effectively distributed food supplies in the LDCs, most recently highlighted by grain shortages in the early 70s, has contributed significantly to an increase in the urgency for agricultural training. The need for highly trained individuals to staff agricultural and rural development efforts in the LDCs has been highlighted as being critical by the World Bank, FAO, the foundations, and many other organizations which are deeply committed and involved. World Food Conference resolutions on the topic stated "that priority be given to, and increased resources made available for, the development of agricultural education and training at all levels"; and, "national, regional, and international resources devoted to agricultural research, extension and training in and for developing countries should be increased severalfold in real terms by 1985."

U.S.universities have been involved in training foreign nationals in agriculture for many years. Many U.S. universities have also contributed to the development and improvement of educational and research institutions serving agriculture abroad. As a result, many university faculty have become familiar with the needs of foreign students from the LDCs and serve as on-campus resources for training. Title XII legislation recognizes the resources available at our universities for responding to world food problems, and a BIFAD education and training group is currently in the process of preparing a source book describing programs and courses that are especially relevant for training foreign agriculturalists.

As the level of experience and interest in the LDCs increases, some U.S. universities are making adjustments in academic programs to accommodate the foreign student and, at the same time, meet the needs of the U.S. student with international interests. Some of these adjustments are modest and not wholly subscribed to by all faculty, but several are now becoming commonplace components of our educational systems.

The common goal is to produce solidly trained teachers, capable researchers, and other practitioners who will be able to respond to the current and future agricultural needs of the LDCs. But often this creates a conflict between the highly specialized and/or sophisticated

---

L. W. Zuidema is Assistant Director of International Agricultural Programs at Cornell University.

training which we require in the United States and the broader-based training often requested and most likely needed in the LDCs.

What is needed is a solid grounding in the basics of a discipline, courses which help the student apply these basics to problems in the LDCs and a wider range of courses which will enable the student to place his expertise in an appropriate framework of development. This does not imply a change of academic standards, but a modification of program content to take account of the environment in which the student will eventually work and the demands which will be placed upon him.

The focus of this paper is on selected academic modifications for graduate students from the LDCs which have been made at some universities and may be appropriate for others to consider.

1. The development of applied discipline-oriented courses focusing on the LDCs.

Courses dealing with tropical soils, crops and livestock production; the economics of agricultural development; the rural development and cultural change add a significant dimension to the degree programs of foreign students who can then focus on the literature and concepts relevant to their own countries. The increase in interest in these courses on the part of U.S. students and the availability of faculty with experience in the LDCs may now make it feasible to develop these courses at other universities.

2. The organization of interdisciplinary courses on development problems.

Interdisciplinary courses dealing with agricultural development problems in the LDCs offer students a more comprehensive and holistic approach than many discipline-oriented courses and help them establish the context for their own potential contribution. They also permit a systematic review of various approaches to common development problems. A course on "special problems of agriculture in the tropics" taught at Cornell by six faculty from six disciplines over the past 13 years is an example of such a course. This three-credit-hour course includes a two-week trip to tropical areas of Mexico.

3. The introduction of courses dealing with the management of agricultural and rural development programs.

In the mid 1960s, Lee Swan from Wisconsin did an evaluation of U.S. higher education's effectiveness in training Filipino agricultural graduates. In a paper based on this study, he says: "If we were to globally classify the educational experience into increasing technical competence and increasing interpresonal competence, I would have to say my impression is that in all academic fields we have done a poor job for the latter competence. There is little doubt that a rather large percent of the foreign students that we're advising are going to eventually end up with some administrative responsibility in their home country, or at a minimum will serve in leadership and

change agent roles. And I doubt if the students sense this. Only one of the 113 students in our study said he planned to go into administration, yet thirty-eight percent of the home-country Filipinios were in administration (within five years of returning to the Philippines)."

In an Agricultural Development Council paper reporting on a conference of rural scientists from Asia who were asked to evaluate their U.S. graduate training, participants responded to the question, "What is expected of those with advanced graduate training when returning home?" A Korean agricultural economist reported: "The most needed knowledge now is perhaps in the formulation of plans and in the ability of getting them understood and implemented." A Nepalese agricultural economist said: "My duties, which may not be dissimilar to those of other professionals in Asian countries, include large amounts of administrative detail, budget processes, research, personnel administration, planning, coordination and inter-ministerial relations. These were not a part of the academic course work which I received. It would have been helpful to me to have had some courses in comparative financial administration, and specifically on how budgets are prepared and administered in developed and developing countries."

Faculty at U.S. universities have come to learn that many of those LDC students who receive advanced degrees in agricultural fields in the U.S. are thrust into leadership roles at very early stages of their professional careers. This is, in part, because the strategy in most countries is to select leaders and administrators from among the best and most highly educated of the technical staff of an agency. Whether or not the person will be able to administer the program is often a matter of determination over time. Some succeed, some fail, and others muddle through.

There is a great opportunity (and perhaps obligation) to assist students from the LDCs to make the transition from academia to the real world of agricultural and rural development. A course (or courses) on agricultural and rural development administration offers students a view of development from the window of program implementation (how to get the job done) and provides sensitivities to the principles and problems of management which they will face in the future. There is a role for the university in adding this important dimension to the normal training of students from the LDCs.

At a Workshop on Teaching Agricultural and Rural Development Administration held at Cornell in 1977, the participants agreed on four goals for such a course.

(1) Students should become fully aware of organizational structures and task environments. They should be able to analyze institutional interdependencies, political and bureaucratic linkages, and intersectoral exchanges.

(2) Students should be made sensitive to problems associated with technical and administrative decision-making, especially under conditions of ambivalence, uncertainty and rapid change. They should be able to define alternatives and develop criteria for choosing between them.

(3) Students should become familiar with rural/urban biases and develop an empathy for rural people.

(4) Beyond its focus on institutional management, administrative training should expose students to an array of communications methods and leadership skills and styles which relate to people management.

I am associated with such a course which is now in its fourth year of evolution. The content of this course begins with a review of the task environment of administrators, administrative structures, and resources which are at their disposal. The next section deals with administrative functions including: staffing and supervision of personnel, planning, program development and project design, economic tools of analysis, budgeting and expenditure management, and implementing and adapting programs. This is followed by a section dealing with types of administrative programs such as research, extension, agricultural services, and rural works and infrastructure. The final section involves discussions of the integration of activities, the interface between public officials and rural people, and the utilization of foreign assistance.

The teaching of management in isolation can be dull, but taught as an interdisciplinary seminar within the context of a common concern with agricultural and rural development, it can be exciting and useful.

4. The establishment of academic programs dealing with international agricultural and rural development.

Once a set of international courses is in place, comprehensive academic programs can be developed for students who wish a concentration in this area. At some universities it is now possible to minor in international agricultural and rural development. International majors are not deemed to be appropriate since traditional disciplinary training is oriented to the reality of employment opportunities. A minor in this area still allows a student to develop these disciplinary skills through a major and to complement this with a substantial dimension of training dealing with agricultural development problems in the LDCs.

One new degree program, the Master of Professional Studies (M.P.S.), can be used effectively for training in international agricultural and rural development. An M.P.S. degree program at Cornell for example, is designed especially for the experienced practitioner of development who may be in an administrative position or in a situation requiring a broad perspective on agricultural and rural development. The program provides opportunities for intensive analysis of strategies for development, acquisition of a broad perspective on practices and trends in world agriculture, and up-to-date training in a disciplinary specialization. Over 40 courses dealing specifically with international agriculture are available for inclusion in this degree program.

5. The development of opportunities for relevant research.

In some disciplines and for many problems, research training is universal and adaptable wherever one works in the world. In many cases, however, there is a need to be concerned about the relevance of U.S. research training for those from the LDCs. The questions are:

(1) What level of sophistication and equipment is required?

(2) How narrowly based should the research project be?

(3) Who can best advise the student?

(4) Where should the investigation of the problem be conducted?

(5) What transferability is possible?

(6) What kinds of scientists does the country need?

(7) In what context will the student be working?

(8) What is the expectation of the home country and sponsor?

Faculty with professional experience abroad are in a better position to answer these questions than those who have little or no understanding of the needs and conditions which prevail in the LDCs. An effort is now being made to respond to these questions to ensure more effective training at many U.S. universities.

The question of "where" research should be conducted has received increased attention over the last decade. There has been a trend toward more thesis research being based on experimentation and data collection in the developing world as a part of U.S. degree training. While this may not be appropriate or feasible in many cases, it has been the key to effective training for several students' in the past and can be expanded in the future. The advantages of thesis research in a students home country include:

(1) the advancement of science in and for the LDCs

(2) the adaptation of researchers to local conditions and equipment with which they will work in the future

(3) development of commitments to local problems with opportunities to readily expand on thesis research in the future.

PANEL 6: ENGINEERING TECHNOLOGIES

Chairperson:
William Ramsey, District Director
Milwaukee Area Technical College

Panel:
Lawrence Barrell, President
Hartford State Technical College

Daniel Finn, Assistant to the Executive Director
National Assocation of Trade and Technical Schools

Hugh McCallick, Dean
College of Engineering
University of Houston

K. Nagaraja Rao, Senior Research Associate
Center for Policy Alternatives
Massachusetts Institute of Technology

Richard Ungrodt, Vice President
Milwaukee School of Engineering

Rapporteur:
Martha Renaud
Institute of International Education

SUMMARY

Manpower studies in the less-developed countries repeatedly point to the relative abundance of engineers and to the shortage of middle-level engineering and industrial technicians. More than 700 U.S. institutions, both in the college-and-university track and among the purely technical/trade schools, offer technician-training programs distinguished by their emphasis on technical problem-solving and hands-on experience with the tools of modern industry.

Developing countries are beginning to discover this resource. "Relevance" to LDC conditions is not a serious problem; these instructional programs are relevant to engineering needs everywhere. While developing-country students may require curricular modifications and different scheduling from U.S. students, there is a universality in the substance of engineering technology programs that makes the question of relevance less than acute.

However, the increasing demand among developing countries for engineering-technology education can result in a sudden influx of foreign students that U.S. technology schools, planned and funded to meet local job-market needs, may not be able to meet effectively. New services are needed, among them improved in-country screening of LDC students before they are sent to the United States, and improved counseling and support services for LDC students to be provided by U.S. institutions once the LDC students are here. A clearinghouse is needed to coordinate LDC requirements with U.S. institutions' capacities in order for the U.S. institutions, which have the resources, to be able to share them most effectively with the developing countries.

Trade and technical schools, outside the usual academic spectrum, represent a learning resource with the kind of time flexibility and emphasis on acquiring skills that many LDC students need. They offer specific skills-training without the supportive liberal-arts training that community and junior colleges usually provide. It is important for LDCs to recognize the value of this type of instruction.

The "engineering team" concept has developed in the United States over a period of 150-175 years with an educational system that has reacted well in supplying the necessary personnel. The engineering-related technologies can produce the economic strength and improved quality of life which the basic research establishment cannot produce. A ratio of 10 engineering technicians to one engineer has been accepted for a developed country. This ratio should be higher for a developing country. Engineering-related technologies are the key to the growth of the engineering profession and its spectrum of manpower.

ENGINEERING TECHNOLOGY AND STUDENTS FROM DEVELOPING COUNTRIES

by K. Nagaraja Rao

1. Engineering and industrial technology programs offered by junior and community colleges and technical institutes and several universities offer foreign students the most direct exposure to, and hands-on experience with, U.S. industrial technology. While modifications are needed in the curricular structure and schedule of courses a foreign student takes, there is a universality in the substance of engineering technology programs that make the questions of relevance less acute.

2. Past and current technical assistance programs of AID and its predecessor agencies, U.S. foundations, and UN agencies have involved a few scores of U.S. institutions in institutional development projects overseas. These institutions have developed competence to work with foreign students and to provide them with meaningful experiences. These institutions are for the most part located in metropolitan centers and are affiliated with large universities. Many have foreign student offices to assist students to meet U.S. immigration regulations and to adjust to campus and community life. They might also have faculty members who have worked overseas and are thus better able to adjust their teaching styles to the needs of the foreign students.

3. As the response to the IIE surveys shows, a large number of community colleges and trade and technical schools which have not so far been involved in overseas work are now attracting a growing number of foreign students.

Many of these institutions are state-supported institutions serving semi-urban local communities and naturally feel that their primary focus ought to be the needs of their immediate clients. The openness of the U.S. system is such that many foreign students have been welcomed by them. On the other hand, several proprietary programs appear to have taken advantage of the surging demand for technical training by foreign students. It is not unlikely that foreign students see the junior college as an easier route for entering into the U.S. and subsequent transfer to a university program.

The current unsatisfactory situation calls for several corrective approaches to assure that the foreign student gets high-quality technical education in the U.S.:

(a) Bilateral government and nongovernmental programs would need to approach requests for large-scale technical-training assistance much more deliberately than heretofore. In collaboration with requesting governments or other sponsors, screening mechanisms in the country of origin of the foreign students would need to be established prior to

---

K. Nagaraja Rao is Senior Research Associate at the Center for Policy Alternatives, Massachusetts Institute of Technology.

permitting a suddent influx of students into the U.S. schools of engineering and industrial technology.

In the U.S., professional and technical societies and accrediting agencies would provide an important source of advice on schools and programs most suitable for the needs of particular countries. They could easily constitute advisory committees comprising of U.S. academics and professional engineering technologists who have first hand knowledge of the country's educational system and training needs. Such mechanisms could also be used to monitor the programs once they are launched.

(b) A clearinghouse (center or other institutional mechanism) is needed to share experiences in international sub-professional technical education. A proposal to focus U.S. efforts in this area is being discussed by several members of the International Division of the American Society for Engineering Education.

Such a center or clearinghouse, operated under the aegis of a professional society of a university, could exchange curriculum materials, provide a referral service for U.S. and foreign governments, organize workshops for college and technical institute administration and faculty, develop a newsletter, etc.

(c) The large demand for engineering technolgoy education makes it incumbent on U.S. colleges and engineering technology institutions to strengthen their counseling and advisory services to foreign students. Unfortunately, however, budgetary stringencies in these institutions and pressures to respond to surging U.S. domestic demand for their programs make it necessary to develop alternative financial support mechanisms. By their very nature, engineering technology programs are capital-intensive and expensive. They are an unusually attractive educational bargain for the foreign student. While government contract programs for training foreign nationals provide for certain overhead costs, the unsponsored student represents a net financial burden on the institution. Even if an institution wants to make its program more relevant to the foreign student, the resources necessary to make them so are not easy to find.

While universities have fora to exchange information on these questions, junior and community colleges and engineering technology institutions have yet to evolve common approaches and even share experiences on these questions.

(d) Organizations such as NAFSA and IIE have held special sessions for foreign student advisers in connection with their national and regional conventions. A more focused effort addressed to the subprofessional technology education community is needed to bring that community to the main stream of international education. This calls for an effort similar to that launched by these organizations in the 50s and 60s to sensitize U.S. universities to international educational opportunities and problems.

(e) Teacher training institutions in engineering technology (and agriculture, business and health) should be encouraged to offer courses related to international development including appropriate technology (which the U.S. also needs in a variety of sectors). Issues related to science and technology have important international dimensions and future U.S. teachers of engineering technology need this broadened outlook as much as the foreign teacher of engineering technology receiving U.S. education.

4. Modernization of curricula in LDC training institutions is another pressing need. Early technical assistance efforts in the 50's and 60's developed institutions in the LDCs in which the traditional mechanical, civil, electrical and chemical technologies of that period were introduced into these institutions. In each of these fields, there have been far-reaching changes in technology, materials, and processes. New technology curricula in energy, electronics and communication, marine sciences, environment, material sciences, manufacturing, computers, among others, have been developed in the United States. A new curriculum development effort would be needed by LDC institutions and U.S. institutions assisting in this development abroad. Here is an opportunity for U.S. institutions and the educational materials industry to develop relevant curricula for such programs. The involvement of scholars from the LDCs in the development of such materials is an educationally sound approach to increase the relevance of such materials for LDC use. Also of interest to LDC educators are approaches now being tried out in the United States to open up opportunities for women in engineering technology.

A PROPOSAL TO REFOCUS U.S. EFFORTS IN ENGINEERING
AND ENGINEERING TECHNOLOGY FOR DEVELOPMENT
by K. Nagaraja Rao and Lawrence L. Barrell

(Excerpts from a somewhat longer paper)

This paper advances certain proposals for discussion regarding evaluation of past efforts and new apprcaches to harnessing the vast resources of the United States in engineering and engineering technology education for development. Specifically, the paper addresses the issue of the formation of a center tentatively called The International Center of Engineering and Industrial Technology for Development (ICEITD) to provide a national focal point for U.S. efforts in international engineering and technology education.

The frequent calls for a New Economic Order, the North-South dialogues taking place in widely different fora, and the forthcoming 1979 U.N. Conference on Science and Technology for Development are all part of a strong new international movement for a reappraisal and reformulation of trade and aid policies affecting the relations between developed and developing countries.

The terms and conditions under which technologies are transferred among nations is at the heart of these debates. At the national level, strengthening the technical and scientific capacities of the LDCs is receiving renewed emphasis.

As a nation which has been continuously involved for more than three decades in assisting developing countries to strengthen their educational systems, especially their scientific, engineering and vocational and technical education programs, the United States is also re-examining its own role in development, with a reassessment of its policies and institutional resources, and new mechanisms for their development.

The Rationale

The underlying rationale for a new look at the role of engineering technology for development was provided by the authors of this paper in an editorial in Science in September, 1978. The editorial focused only on engineering technology, but full exploration of the subject must include, as well, issues concerning U.S. engineering education as it relates to the developing countries.

Pertinent parts of the editorial are reproduced on this and the following page:

In three decades of assistance to education in less developed

---

K. Nagaraja Rao is a Senior Research Associate at M.I.T.'s Center for Policy Alternatives. Lawrence L. Barrell is President of Hartford Technical College.

countries (LDC's), the United States has exported with varying effectiveness models of science-based engineering curricula. These efforts have created in the LDC's a few national centers of excellence in advanced engineering education, which are oriented by and large to solving the problems of the modern industrial sector and are sustained by disproportionately large investments by national ministries of education. The "scientist engineers" produced by these elite centers migrate to and perform well in overseas universities, but only a small percentage of them return home. At the other extreme of the technical manpower spectrum, a few LDC's have an improved local capacity for training skilled and semiskilled workers for industrial employment. International development banks, foundations, and bilateral programs of the Agency for International Development have contributed to these efforts.

Much greater national efforts are still needed to improve the training of skilled workers for agriculture and industry in the LDC's. Manpower studies in the LDC's repeatedly point to the relative abundance--in fact, oversupply--of engineers and to the shortage of middle-level engineering and industrial technicians. They also show a pattern of distribution of these high-level human resources that is detrimental to regional and especially rural development. Urgently needed are middle-level engineering and industrial technicians who are able to implement and manage the more sophisticated technological systems now entering or being developed by countries that are rapidly becoming industrialized.

During the same 30-year period, profound changes have taken place in technological education in the developed countries, especially the United States. The technician was rediscovered in the United States in the late 1940's. Since then, programs for the training of engineering and industrial technicians with different levels of skills and knowledge have been developed in various institutional and organizational settings. When properly paired to the needs of LDC's in different stages of development, they will be able to respond to these needs. Their distinguishing characteristic is the emphasis placed on technical problem-solving and hands-on experience with the tools of modern industry, through the use of teachers with practical industrial experience.

More than 700 U.S. institutions are engaged in these programs. The outstanding ones are the 89 technical colleges, accredited by the Engineers' Council for Professional Development, which offer associate degrees in engineering technology and industrial technology. Also accredited are another 30 colleges offering associate and bachelor's degress and 35 colleges offering only a bachelor of science in technology.

Other institutions include community and junior colleges, technical institutes, and some universities and secondary-level schools offering post-secondary advanced technical programs. Until now, colleges and institutes of engineering technology have been used only sporadically in U.S. bilateral assistance activities. These institutions, especially those with experience in international work, are now considering how to pool their resources. They have the capacity and maturity to speak to LDC's that are demanding the sharing of technological resources.

It is essential that international policy-making bring these resources to the attention of LDCs. This opportunity to match these appropriate resources with evident needs should not be missed.

A Brief Review of Past U.S. Efforts and Future Prospects

Supported for the most part by the Agency for International Development and its predecessor organizations, a variety of U.S. educational institutions have contributed their expertise and manpower for national educational planning, research and development, institutional development, teacher training, and curriculum development in all the developing regions of the world.

When one looks to the future, the opportunities for U.S. educational institutions in engineering and industrial technology to assist in development abroad appear to be even greater and more challenging. The oil-rich Middle-East countries and other members of OPEC have already exploited the U.S. institutional capability in these fields. Emerging African countries entering a period of industrial development would be needing much assistance in technical manpower development. People's Republic of China has expressed an interest in U.S. training for its young men and women in engineering and industrial technology.

The fast changing nature of technology in several areas of electronic communications, computer technology, mechanical and materials technology,technologies related to conventional and non-conventional energy production, technologies related to marine resource recovery, among others, would require that LDC nationals be trained in the testing, repair and maintenance of these systems, both those they may import and those that several rapidly developing LDC's are capable of designing on their own.

In view of these changes, older systems of technical training in the LDCs would need to be modernized. Larger pools of teachers in the modern technologies would need to be developed in the LDC's.

A Proposal to Refocus U.S. Efforts in Engineering and Engineering Technology for Development

Thus the need for a focus of U.S. efforts in this burgeoning field is urgent. The center proposed here is only one approach. The present paper will, however, elaborate on this one suggested mechanism to stimulate discussion on how the engineering and industrial technology educational community could organize itself, with attendant benefits to the community and the nation. Other alternative approaches are listed at the end of this paper.

The multiple roles of such a center would be:

1. To provide linkages to LDC institutions and governments on matters related to engineering and industrial technology education.

2. To help develop resources in U.S. industry for training LDC nationals.

3. To act as an information resource for U.S.industry and educational institutions which could belong to the center as Associates or through other classes of fee-paying memberships.

4. To provide assistance on a contract basis to international development agencies in engineering and industrial technology education.

5. To function as a clearinghouse of materials already developed by U.S. institutions in past programs of international development. It would develop bibliographies of such materials and refer inquiries to the institutional sources of these materials.

6. To act as a curriculum-development center or to coordinate curriculum development in a consortium of member institutions.

7. To organize study and research teams to participate in studies of national and international issues in engineering and technology education in collaboration with member institutions.

8. To provide an interface with professional engineering societies, accrediting agencies, and vocational and technical education associations on matters related to international development.

9. To sponsor symposia, workshops, conferences on engineering technology and technical development.

10. To develop rosters of U.S. and LDC institutions and individual experts interested in international development.

The role that the center would play would be of facilitating the activities of member institutions and in no case to substitute for activities that members are equipped to perform.

Relations with Existing Organizations

There are a variety of organizations in the United States in engineering and industry technology education: ASEE, American Vocational Education, American Society of Training Directors, ECPD, to name a few. These organizations are for the most part concerned with U.S. issues and programs, although some of them have been involved in various ways with LDC programs.

The proposed center could be organized by one of these agencies or a group of them. The center could be physically located in a university or technical college (just as the center for science education was located at the University of Maryland). Alternatively, it could function under the aegis of one of the sponsoring societies.

Issues of Funding Such a Center

The questions of start-up and sustaining funding have been major stumbling blocks. For start-up, clearly foundation or U.S. Government agency support would be necessary. It is possible, too, to conceive of a few major private donors who would contribute. The U.S.professional

organizations and associations that might sponsor the center would need to take a major hand in raising the initial capital. Institutional memberships represent another potential source of funds.

The services the center would provide should be priced to cover all operating costs.

Research grants and contracts are another potential source of operating funds. It is clear that the quality and promptness of the services the center would provide would in a large measure determine the support it can expect from its services.

Although this paper has described the objectives and operating modes of a center, other alternatives to provide a focus for U.S. efforts in engineering and industrial technology education might include the following:

1. Organize an Annual National Conference on Engineering & Industrial Technology Education for development.

Objective: Bring together industry, university, technical colleges and institutes involved in overseas development to share experiences and develop a network.

2. Devote an entire issue of the ASEE or other professional journal for descriptive and analytical articles on Engineering Technology Education for Development.

3. Develop a listings of all institutions engaged in engineering and industrial technology programs abroad and update it each year.

4. Develop listing of curriculum materials and other instructional devices developed by institutions in 3. Suggest procedures for sharing them.

5. Continue informal meetings of interested persons in connection with ASEE or other professional society meetings.

6. Develop inventories of projects supported by AID, World Bank, UNESCO and other international agencies.

The authors hope that the readers of this proposal would contribute additional ideas and suggestions for putting the center or alternatives into action.

ENGINEERING TECHNOLOGY FOR DEVELOPING COUNTRIES?

by Richard J. Ungrodt

(Excerpts from a somewhat longer paper)

Throughout history, every country has shown an interest in advancing its economic and political position relative to its neighbors and the rest of the world. The primary interest of any developing country is generally to establish an economic advantage, first for survival and second for advancing its economic and political position in its sphere of influence. The skill available in applying knowledge for utilization of the country's natural resources will determine the country's survival and more importantly the rate of its economic advancement.

In seeking to advance their economic position, most developing countries will first buy the skills of some foreign owned company from an advanced technically developed country. National pride leads to the second step: to have their own young people educated to take over the process of exploiting their own natural resources. The young people are sent to the technically developed countries for their education with the understanding that they will return to work for the economic advancement of their country.

Historical Perspectives

The United States in its early history imported knowledge to produce products for its own needs and eventually for export to Europe, then to the rest of the world. Today we export knowledge and import products, while in the past we imported knowledge and exported products. Most developed countries today are exporting their students so they can import knowledge they require for developing their economy and their balance of trade by exporting goods and services.

The quantity, quality, and level of a country's technical manpower is directly related to its economic level and organization. The spectrum of technical manpower ranges from the practical to the theoretical and extends from skilled labor, craftsmen, industrial technician, engineering technician, engineering technologist, technical engineer, scientific engineer, engineering scientist, and scientist. Developing countries need more problem solvers and fewer researchers, and therefore require more practical problem solvers related to engineering.

Engineering Related Technologies

Most developing countries realize that the first steps in advancing their economy is the development of problem solvers and skilled workers who can utilize the country's natural resources and raw materials to

---

Richard J. Ungrodt is Vice President for Academic Affairs, Milwaukee School of Engineering.

produce goods and services for a profit and thus eventually raise the economic level of the country. The engineering technologist (who is often called an applied engineer in developing countries) is one of the key problem solvers who can develop the natural resources of the country for the benefit of its population. These modern-day engineering problem solvers utilize the current applications of scientific and engineering principles to provide the basic needs of the populace.

The engineering team concept has developed in the United States over a period of 150 to 175 years with an educational system that has reacted well in supplying the necessary personnel to meet the various levels of skills and knowledge within that technical spectrum. The exploration and research of the scientist and engineering scientist leads to the development of new scientific and technical knowledge. This new knowledge is then applied with creativity and innovation by the engineer to develop sophisticated and complex technical devices and systems.

Engineering-related technologies have their beginnings in the creative innovations of engineering. The engineering technicians and technologists then utilize the complex and sophisticated new engineering information in the more routine application, development and design, and maintenance of the industrial system and its technically sophisticated products. The education of individuals at both the associate and the baccalaureate levels in engineering-related technologies is key to the economic advancement of most developing countries.

Forces at Work

History clearly shows the dynamic nature of the many forces present in any political or geographic entity be it either a developed or developing country. National goals are not always established formally and are not always supported in a consistent manner within the political entity. The national goals having their roots in economic power must be consistent not only with the political goals of the country but more importantly with the goals of the leaders of thought whether those leaders are the academic educators or the religious leaders. The current instability in the Mid-East is a prime example of these forces.

The engineering-related technologies can produce the economic strength and improved quality of life which cannot be produced directly by the basic research establishment. It is interesting to note that the current structure of engineering curricula in the United States has since 1955 moved in the direction of considering the first professional degree to be at the masters level, with the undergraduate degree being a basic science degree. This has resulted in many institutions in the United States producing baccalaureate engineering graduates with a basic science degree and having a very minimum of engineering problem-solving skills, The recent growth of baccalaureate programs in engineering technology is already meeting the need for graduates who fill entry-level positions in the engineering profession requiring problem-solving skills in current state-of-art engineering areas.

Foreign students are often confused by the similarities between engineering and engineering technology curricula. The applications and design-oriented engineering technology curricula will more nearly meet the immediate needs of the developing country. However, the enticement of advanced degrees often leads to a Ph.D. with a research emphasis that is inappropriate in the developing country at that time.

The goals of students and their families are important forces to be considered. Young idealistic students come to a technically developed country to be educated with the intent of returning to help their country. Students learn more than technical problem solving skills. They also learn to enjoy the "good life" of the high standard of living of the developed country. Many find reasons not to return to their native land.

The academic goals of students often change. Academically well qualified and successful students are encouraged to continue their education beyond the basic level. The majority of advanced-level academic programs in engineering and related areas lead to a doctor of philosophy degree which is research oriented. The abstraction and theoretical nature of such an education does not match the immediate educational needs of the economically developing country. When these young persons return to their countries they find little direct industrial use for their theoretical knowledge and may apply their idealism in the educational establishment where they can research philosophical theories and conduct research of an advanced technical nature for which the country is not appropriately prepared.

A ratio of ten engineering technicians to one engineer has been accepted for a developed country. This ratio should be higher for a developing country. The rapid leapfrogging of engineering and technical developments in a developing country puts an undue emphasis on advanced education. Students who might be interested in engineering related technology often consider a two-year associate degree program as a non-collegiate program with a resulting career that leads to a nonprofessional position. Students who complete a 2 +2 program resulting in a baccalaureate degree want to function as and be considered as "regular" members of the engineering profession.

The future rewards as perceived by the student are important to his or her selection of a program. There is great prestige in developing countries for individuals with a master's degree or doctorate degree, particularly since college education itself is rare. There is social and financial value of the advanced degree which comes from the usual process of employing those graduates in positions with managerial responsibilities. Management titles are generally prestigious in the eyes of the masses. All of those factors produce pressures to force students to choose programs that are more than two years in length and lead to degrees useful in moving up the administrative ladder. As a result, we have insufficient enrollments in two and four year programs in engineering technology.

Conclusions

The economic growth of any developing country is related to the quantity and quality of the spectrum of its engineering manpower. Engineering related technologies are key to the growth of the engineering profession and its spectrum of manpower.

The forces affecting the acceptance and development of engineering related technologies include:

1. National Goals and Priorities
2. The interface between engineering and its related technolgoy
3. Loss of trained personnel to developed countries - brain drain
4. Changing academic goals of students
5. Prestige of advanced academic degrees
6. Financial rewards for technology
7. Social recognition of technicians

Developing countries must find better ways to motivate increased numbers of qualified students to study engineering related technologies and to return to their country to become productive performers.

TRADE AND TECHNICAL SCHOOLS: AN EDUCATIONAL SHORTCUT

by Daniel F. Finn

Trade and technical schools in the United States are engineering technology specialists. They normally specialize in one or two areas. These schools offer many programs in such specialties as electronics, air conditioning, automotive, welding, and drafting, for example. They are typically small - 200 to 500 students - and provide students personalized attention. Theory classes normally have a low student/teacher ratio. Laboratory and shop groups are even smaller.

Trade and technical schools offer a "no frills" approach to vocational education. This means that they concentrate on the essential knowledge and skills a student must master in order to obtain an entry-level position in the field and be successful. They keep costs down by offering only essential services. You won't normally find any swimming pools or indoor recreational facilities.

While some schools offer baccalaureate degrees in technology, and others offer associate degrees in technology, many others offer no degrees at all. Instead of focusing on degrees, all of these schools focus on the technical skills needed in today's technological world. Students find that they will take few liberal arts courses, but will instead spend the school day in the classroom and the laboratory learning their field.

Trade and technical schools focus on a "hands-on" approach to learning. Students normally spend 50 per cent of their time in the shop or laboratory. They receive the theory in the classroom and then go out and apply it in the laboratory. As we all know, the involvement of all the senses in practical training increases learning. Because of their size, these schools can adjust quickly to the changing technology of industry. They are privately owned and operated. Their chain of command is very short. If a teacher wants to change a course or needs a new piece of equipment, he/she can go to the school owner and ask for it. They stay tuned in to industry's developments and change their programs as the industry's technology or skill requirements change. The instructors in the schools have had many years of experience in the field and they stay in touch with it. The schools as a result have developed close contact with companies in the field over the years.

At present, many schools have students from other countries. Rarely do they have large numbers, most students are personal referrals from former students, employers; or relatives. Most schools spend little time or effort recruiting students from abroad. However, the small size of trade and technical schools makes them an ideal training site for students from other countries because of the personalized attention given to each student. The small class size and practical hands-on approach to training provides an excellent learning environment.

Daniel F. Finn is Assistant to the Executive Director, National Association of Trade and Technical Schools.

A few large schools have contracted to train groups of students from some countries. They would normally provide for class-size training groups to come to the United States. Some schools, mostly large ones, have affiliates in other countries, primarily Canada and Europe. Some schools have contracted with other countries to train students in specific technologies. Electronics and aircraft maintenance are two examples. They send instructors and equipment to train these students in their home countries.

As for recommendations for the future, it is my belief that there is a growing world-wide need for skilled technicians. There exists a gap between the engineer and the semi-skilled labor force. In this country, graduates of a one-year technician program can often obtain technical positions which pay more than the salaries available to some college graduates. It is important that developing countries identify these needs and avoid placing too much emphasis on training engineers while failing to provide an adequate number of skilled technical support personnel.

It is important that we focus on the skills the graduates need and the quality of education they receive, not solely on the degree awarded. We need to focus on the most economical methods of training in terms of time and money, without sacrifice of quality.

I believe accredited trade and technical schools are ideally suited to close the gap between the engineers and the semi-skilled labor force. The accrediting process requires that a schools' education and administration undergo rigorous examination by an accrediting agency recognized by the U.S. Office of Education.

These schools, because of their small size and flexibility, can adapt quickly to changes in technology in the country. Their size and flexibility also permit them to adjust quickly to student needs. These schools typically operate on a year-round basis. Their educational focus is on technical skills; and they spend little time on history or literature courses and other liberal arts courses. Because of this, they can train a technician in less time than many other educational institutions can. It would not be unusual for a student to complete a technician program in nine to 18 months. Programs in some areas are even shorter, for example, welding. Trade and technical schools can take a person interested in a career in technology, provide intensive practical oriented training under a closely supervised environment and graduate a qualified technician in two years or less.

In planning for the future, developing countries and their students need to take into account the need for trained technical personnel and then consider trade and technical schools as a resource in meeting the shortage of technicians world-wide.

PANEL 7: SCIENCES

Chairperson:
Dorothy Zinberg, Director of Seminars
and Special Projects
Center for Science and International Affairs
Harvard University

Panel:
Robert Brasted, Professor
Department of Chemistry
University of Minnesota-Minneapolis

Gordon Heibert, Program Officer
National Science Foundation

Michael J. Moravcsik, Professor
Institute of Theoretical Science
University of Oregon

Frederick Moavenzadeh, Professor
Department of Civil Engineering
Massachusetts Institute of Technology

Rapporteur:
Frank D. Hansing,
National Academy of Sciences

SUMMARY

The panel was asked to discuss the appropriateness of science disciplines in U.S. universities for training students from foreign countries, particularly LDCs. It was pointed out that the subject could be approached from the standpoint of undergraduate vs. graduate training, basic vs. applied science, and national vs. international aspects of science education. There was little discussion concerning substantive aspects of the disciplines. The discussion centered around the socio-cultural and the political aspects of students coming to the United States and also returning to their home countries.

It was pointed out that foreign students must wish to come to the United States to study; that they have a right to choose their curriculum, assuming they have the appropriate requirements for entering their designated curriculum.

The U.S. institution should make all the moralistic criteria known to the foreign students before they come to the United States and also help to make the transition into the classroom as easy as possible.

There is great concern over the selection of foreign students, particularly from the standpoint of whether the best students are getting to the United States and whether they are getting into the programs in which they are interested and for which they have the appropriate background. Sometimes selections are made on basis of institution attended rather than background or other criteria.

There is also a concern over the environment in which a new Ph.D. has to operate, in comparing opportunities within the United States and in foreign countries. In the case of foreign students, there are many elements of training they do not receive in the United States which would help them to conduct science programs in their home countries.

There is also concern that science education must mature and that the foreign student have an opportunity to top off his or her work in the United States before returning home. Foreign students may receive enrichment by other means than by coming to the United States.

The question of bridging the gap of communication between countries was discussed. Most countries agree that the scientific language is English, at least transitionally. It is difficult to predict what will happen in future years.

In connection with some of the abovementioned points, there were some specific recommendations:

1. Develop a booklet or a guide for foreign students who wish to come to the United States for study. This guide would provide answers to a lot of questions pertaining to background requirements, cultural adjustments, etc., for foreign students. Such a guide is being developed for the discipline of chemistry through the American Chemical Society. Information may be obtained from Professor Robert Brasted, Department of Chemistry, University of Minnesota. Each discipline could develop such a background guide for foreign students.

2. To help cope with the problem of selection, visiting teams could be sent to the various LDCs to interview prospective students. The interviewers could prepare a page evaluation sheet which could supplement the basic application which is often lacking important pertinent information. This procedure is being followed in physics and again could be followed in other disciplines. Further information about this plan may be obtained from Professor Michael Moravcsik, University of Oregon.

3. To ensure that the training of foreign students in the U.S. include sufficient elements which would not only help them carry on scientific programs but to create an atmosphere under which appropriate science can be done.

4. Develop summer institutes in foreign countries which would bring U.S. professors to foreign countries for specific periods of time and for specific purposes, rather than bringing foreign students to the United States. There are naturally many problems in developing institutes. However, the LDCs will definitely be losers if nothing is developed following the institutes. Information on a science-education improvement program in India may be obtained from Dr. Gordon Heibert, National Science Foundation.

5. Develop long-range relationships between a U.S. university and a foreign institution in work on common research projects. In the development of a specific institute, the ministry of the foreign country could be a participating third party. A relationship like this has been developed between MIT, the University of Cairo and the Ministry of Education of Egypt. An institute for technological planning has been developed at the University of Cairo. As this develops, the input from MIT will gradually phase out. The coordinator for this technical program at MIT is Professor Fred Moavenzadeh.

THE SCIENCE EDUCATION IMPROVEMENT PROJECT IN INDIA -- A PERSONAL ACCOUNT

by Gordon L. Hiebert

The Science Education Improvement Project (SEIP) was an AID project which attempted to improve science and technical education in India by sharing the U.S. experience in these areas. Rather than training Indian teachers in the United States, the project brought U.S. teachers to India where they helped to organize short courses and workshops for local teachers. Initially, these summer institutes were the only program element. Later a more comprehensive program was implemented. This report will describe the summer institutes and the follow-on program and discuss some of the assumptions on which the program was based.

This India program may be of interest to this conference because it involved a direct impact of U.S. science education on India. The successes and failures of the program may illuminate the debate concerning possible alternative programs for the future.

The Summer Institutes

The summer institutes were winners. They evoked a remarkable amount of enthusiasm from participants, staff, U.S. consultants, and sponsors. For the participants, the summer institutes provided a unique cross-cultural experience. Most of them had no prospect of going abroad, but through the summer institutes they could have an international experience. The participant was typically a person low in the pecking order, and the chance to participate in an institute involved welcome recognition. Through the institute, participants came to realize that others felt as isolated and frustrated as they did. Once shared, these problems were easier to bear.

For the professor and his staff, the summer institute provided valuable contacts with U.S. academics. The professor was able to plug in to the international system more effectively. Occasionally, staff found chances to get into U.S. doctoral or postdoctoral programs. Certainly the hope for professional advancement was a strong motivation to be involved in the program. Even a slight chance to get to study at a U.S. university was to be treasured.

The U.S. consultants were happy to have a summer stipend and the fringe benefit of international travel. When you go to India, any place in the world is on the way. In addition, the experience of

---

Gordon L. Hiebert is Program Manager, Division of International Programs, National Science Foundation.

being a welcome foreign visitor for an extended period was inherently rewarding. The experience of exchanging information about educational strategies was invigorating, because it highlighted many unexamined assumptions about U.S. educational practice.

AID found the mechanism of the summer institute of particular interest because it was capable of being scaled up to a level at which it could make a macroscopic difference.

The general high regard for the summer institutes is indicated by the various conflicting claims of paternity. USIS claimed credit for the summer institutes in India, because it had provided the first few U.S. consultants and had arranged for the publication of limited editions of recent U.S. science textbooks and teachers' guides (through the Indo-U.S. book program). These materials were used extensively in the first institutes. AID felt that it had really invented the summer institutes by nourishing the fledgling program and accommodating the need for U.S. advisers through four university contractors, already in India. The University Grants Commission, which sponsored the summer institutes in India and paid all the costs of Indian staff and participants, regarded the summer institutes as their program. The various university contractors which recruited advisers and, at least initially, procured and delivered various commodities--books, equipment, etc.--took a very proprietary interest in their work. Of course, the National Science Foundation, with a certain amount of false modesty, noted that the original prototypes were NSF funded summer institutes in the United States. 1/

But the summer institutes were also losers. Participants returned to their own classrooms and found they were unable to make use of their summer institute training. This was particularly true of science teachers from the "higher secondary schools" and "pre-university courses." One looked in vain for classrooms in which the "new physics" or the "new math" were being taught.

I spent a sabbatical year in India during 1965-66 and talked with many former participants. The message was the same everywhere" "But

---

1/It was interesting to learn that Dr. Loria of the University Grants Commission visited the United States in 1958 and saw the NSF summer institutes in operation. Upon his return to India he was instrumental in getting UGC sanction for a small project at Delhi University which ultimately became a series of summer institutes undertaken entirely on local initiative and supported entirely by local resources. I regard Dr. Loria as the "true" father of the summer institutes in India.

you don't understand." I checked with the publishers of the sample textbooks to find out about local "adoptions." There were no local adoptions. My informants were right: I did not understand.

From the point of view of the University Grants Commission, the summer institutes largely accomplished their stated objectives. These objectives are clearly spelled out in the UGC public announcement of the summer institute program. The institutes were intended to:

- improve participants' knowledge of subject matter,

- establish new channels of communicaton between people and institutions,

- demonstrate novel and inexpensive laboratory equipment,

- increase teacher capacity to motivate students to study science,

- identify recent developments,

- develop a scientific approach to problem solving, and

- promote the discussion of common problems.

When judged in terms of these objectives, the summer institutes were quite successful. 2/

The expectation that any institution would "adopt" a textbook was based on ignorance of how the educational system works in India. The following is a list of some premises which generally are true in the United States but are not true in India.

Premise: Education has intrinsic value.

False. Education is valuable if it enables you to qualify for a chitti--a certificate or degree. The term "educational wastage" is used to characterize the education of a person who does not succeed

---

2/Dr. Usha Kumar of the Indian Institute of Technology Kanpur circulated a questionnaire to ca. 4,000 summer institute participants. Eighty per cent of the usable responses indicated that the summer institutes had improved knowledge of subject. This same survey indicated that 60 per cent felt that lack of funds was the main deterrent to implementing ideas from the summer institutes, 30 per cent cited the rigidity of the syllabus, and 18 per cent cited work load as the obstacle.

in getting the chitti.

Premise: Education should be relevant to the world in which the student lives.

False. Education should be relevant to the external examination.

Premise: The external examination should ask questions which are relevant to the world in which the student lives.

False. The external exam should ask questions covered by the syllabus, taking care not to repeat any question asked the previous year.

Premise: The syllabus should include topics which make education relevant to the world in which the student lives.

False. The syllabus should follow tradition and avoid including new topics which the teacher will be unprepared to explain.

Premise: Teachers are rewarded for creativity in the classroom and making education relevant in spite of the restrictions of the syllabus and examination.

False. Spending classroom time on any topic not included in the syllabus is described as "academic inefficiency." The school inspector's job is to identify and discourage instances of "academic inefficiency."

Premise: Educational standards are increased by increasing the quality of the curriculum and the quality of instruction.

False. Educational standards are increased by increasing the fraction of students that fail the examination.

The Follow-on Program

Although most people liked the summer institutes, it was clear that a more comprehensive program would be needed to effect any demonstrable changes in Indian classrooms. AID turned to NSF for help.

NSF's position was that it did not endorse any products but it was supportive of the exchange of information about various educational experiments both in the United States and elsewhere. At the time that the foundation was approached, it had already cooperated in the export of trial samples of summer institutes in Latin America and Africa. NSF agreed to help--but with two conditions: first, it should be made very clear whether or not the Government of India and the local authorities wanted NSF to be involved and, second, the design of the follow-on program should be established through joint planning.

The first condition stemmed from sensitivity about the possible implication that the university contractors had done their job badly. If NSF assumed management responsibility, it would have to dip into the same manpower pools which the contractors had used. Considering the problems to be faced, it was better to get involved through an invitation than by volunteering.

The second condition reflected a concern for operating the program on a joint cooperative basis rather than as a U.S. program. The program design problems appeared to have been the result of too little active involvement of the Indian side in the design phase of the program. NSF was more disposed to look for Indian solutions to Indian problems than U.S. solutions.

AID agreed to the two conditions. Arrangements were made for a high-level protocol visit, and the President's Science Adviser was enlisted to lead the U.S. delegation. He delivered a great message from President Johnson which promised "...all the help that is ours to give..." An equally prestigious Indian delegation received the message and accepted the offer.

NSF mobilized a delegation to the planning conference which was to chalk out the follow-on program, and the U.S. and Indian delegations met in Kashmir to lay their plans. This was an occasion for serious planning, because it appeared that both AID and the Government of India would put up the necessary resources and personnel to mount a significant program. Because of the circumstances of the meeting, it looked as though there would be a chance to dispose of old stereotypes. It was a pregnant occasion.

The planning conference recommended five program elements. The summer institutes would continue but would make greater use of locally produced teaching materials and local resource persons. Special attention would be given to opportunities to use the summer institutes to implement any syllabus revision. The four new elements were: (1) College Development Projects, (2) School Development Projects, (3) Materials Development Projects, and (4) Special Projects.

College Development Projects. The U.S. participants in the planning conference listened to the account of how the syllabus-examination system made change almost impossible but came to an optimistic conclusion. In India, as in most other countries of the world, degrees are awarded by universities, not colleges. The university prescribes the syllabus, sets the exam, and awards the degree. Colleges affiliated with the university prepare students to take the university exam. At that time there were, on the average, about 50 colleges affiliated to each university. Thus, the introduction of a new topic in the syllabus of one subject would simultaneously affect teachers of that subject in about 50 neighboring colleges. This seemed like an ideal arrangement for implementing change on a meaningful scale. With encouragement from the University Grants Commission, it seemed likely that some university professors would be interested in participating in educational experiments of this type. The planning conference recommended that support for such modular changes be part of the comprehensive program.

School Development Projects. An analogous strategy for implementing changes in school level education was recommended. In India, as in the

United States, education is a "state subject" and not the direct responsibility of the central government. Unlike the United States, India has relatively few school districts. The planning conference recommended that the comprehensive program be responsive to requests for assistance from the responsible school authorities.

Materials Development Projects. The planning conference recognized the continuing need for locally produced teaching materials and called for local initiatives. U.S. prototypes could be made available, but it was becoming clear that they would have to be re-invented in India if they were to be of any real use.

Special Projects. Mindful of the need for flexibility and the need to avoid the pitfalls not yet seen, the planning conference recommended a category of special projects. The comprehensive program should be able to learn from its own experience and capitalize on future opportunities for productive initiatives.

The implementation of the comprehensive program was fairly straightforward. The proposed program elements proved workable. The program did not always reach performance targets set by AID, but the idea of working through the educational system was sound.

A special problem is worthy of mention. The planning conference, with some urging by the U.S. delegates, recommended the establishment of an agency which could take oversight of the full range of activites envisioned by the comprehensive plan. The new agency came to be called the National Council of Science Education (NCSE), but it never came into existence. This failure on the Indian side to set up the NCSE led one Indian colleague to characterize the program as "the AID handshake but with only one hand!" From AID's point of view the Government of India had reneged on a commitment, and NSF was suspected of not pushing hard enough on the question. The best that can be said is that the NCSE was not "in our stars."

The Salient Lesson

Science, and ultimately science education, is an inherently international enterprise. It flourishes when there is a timely and full exchange of information. The pursuit of science by LDCs is invigorated by the flow of information and stultified when the flow is cut off.

Many students from LDCs study in U.S. institutions. They constitute both an economic and human resource to these institutions. But many of these students never return home to make a contribution where it is needed most.

The lesson of the SEIP is that the U.S. professor can make a welcome and effective input by giving his seminar or short course in the foreign university. The cost-effectiveness of this alternative should be carefully weighed before concluding that the best option is to educate LDC students in the United States. The experience of

the SEIP demonstrates that there are many U.S. academics who would answer the call to help and that their help would be welcome on the other side.

CHEMICAL EDUCATION ORIENTATION GUIDE FOR FOREIGN STUDENTS

by Robert C. Brasted

I was told at a recent meeting that the number of committees, institutes, task forces, associations, and other special interest groups interested in foreign students is staggering--perhaps nearing a thousand. Why should we, as a subcommittee operating within the American Chemical Society and its Committee on International Activities, feel compelled to create yet another? The answer is that in none of the many scores of groups that I have searched do I find even one that addresses the real reason for the student's coming to these shores: that is, to learn, study, and achieve mastery in some field, in this case chemistry.

Our objectives then are quite different from those described by other groups. There is no criticism leveled at any of them; they all address important issues. For our part, we hope to increase the ease of entry for the foreign student into the classroom and the laboratory more specifically than into the country, the economy, the community, the hospital or health plan, the monetary system, or--as important--out of the clutches of the customs and immigration authorities.

A few factors that helped direct our thinking are these:

1. A foreign student wishing (and the emphasis is on his or her own wish) to come to the United States to study certainly has rights or choices with regard to his or her own program. However, if he or she is to succeed, certain ground rules should be followed. We hope to help the student understand better what these ground rules are.

2. For whatever reason--prestige, a better understanding of this field, or both--most students wish to pursue a degree and thus to obtain a meaningful stamp of approval for work done in the United States. If so, then there should be in the bank of knowledge for this particular student a common deposit.

3. If a student, at whatever level, comes to learn a specific technique or obtain a very specific body of information in a specialty, then there is no reason why the majority of institutions cannot provide many options. Our institutions should be sympathetic to specific needs. However, there should be a very important caveat: you do not place this student in an academic (or vocational) environment unless you have a high order of confidence that he or she possesses the necessary intellectural tools and laboratory skills. We try to do this for our own students; why not for the foreign students? The major thrust of our Chemical Education Orientation Guide booklet

---

Robert C. Brasted is Professor, Department of Chemistry, University of Minnesota-Minneapolis.

is, then, to make the foreign student aware of these prerequisite skills and expectations.

It may be that the U.S. educational plan is so varied, not only within a discipline, but from institution to institution, that it seems impossible (even improper) to try to "guide" a foreign student in his or her entry into the U.S. classroom. To attempt to overcome in a single volume all hurdles for all specialties would border on the impossible. However, we felt that if one discipline--chemistry--has a measure of success, perhaps others will follow, learning from our mistakes and/or adding to our successes.

A valid criticism has been leveled at our discipline. Are we training these young people for the chemistry that will be useful to them upon their return to the home country? The question is also valid for our own domestic students. Our answer, in general, is that we train in basics and in methodology that will open a variety of doors, whether the student moves into industrial complex, education, or indeed, to return to another country.

If a young person comes to us to learn intricacies of, say, catalysis for the petroleum field, but doesn't know what a catalyst is, we have a problem. Our product, especially at the doctorate and postdoctorate stage, is admittedly often overtrained (even ill trained) for the local home situation. The often-recommended cure is to tailor-make a program for the home country. I cannot feel that the completely tailor-made product is best for the foreign country. Let us not discard all theoretical training for individuals from LDCs. Universities in emerging and developing countries should not be without the well-trained and theoretically turned mind. Obviously, there are ancillary problems that such individuals may encounter, especially the lack of collegial minds for daily professional interchange. There are those within my professional acquaintance who, on hearing this, would claim that I "speak with a forked tongue." My last doctoral candidate from an emerging country was discouraged from continuing his studies in circular dichroism of coordination systems and advised to move into the area of public health.

The foreign student is in no different position from that of the domestic student. Both must enter the educational system realizing that a great deal of walking is necessary before one takes to the air.

As we already know, there are almost as many baccalaureate students as doctoral. Our Guide was devised to help students at all levels:

1. Those with no firm or especially realistic ideas of the basic U.S. plan of education.

2. Those with grossly inadequate preparation in the field of chemistry.

3. Those without an understanding of some of the moralistic values we place on those participating in the many evaluation devices that we have created.

4. Those with no experience in the multitude of measuring instruments that have been used successfully in our educational system.

5. Those with little knowledge of the major text sources on classroom teaching.

In putting together this guide, one of our reviewers suggested that we might frighten away the prospective foreign student. Perhaps so, but I would hope that with advance information, major deficiencies could be corrected either before arriving in this country or shortly afterward, and--most important--before entering a formal program of study. At the expense of redundancy, our intention in the Guide will be to produce a better educated person, one who will return to his home country with a feeling of warmth for our people and our system of education. I think that we would all agree that such would be difficult if our student's experiences had been filled with frustrations, disappointments, and even failure in the classroom.

In essence, the Guide's construction is deceptively simple. It is inexpensive in dollar cost for what it can contribute.

I. It clearly states that this document is in no way a master plan of education for the United States, nor (most emphatically) does it suggest that it is an ideal blueprint for any country's chemical education system!

II. The user is assumed to be one who himself or herself has chosen to come to the United States and has some source of financial support. Although we do not concern ourselves in a primary sense with stipends, there is a section devoted to teaching and research assistantships.

III. The financing for the Guide itself has not come from any governmental agency nor from industry. It comes totally from the individuals who are members of the American Chemical Society (not a trivial percentage of whom are themselves foreign chemists). There is no "ulterior" motive except to help our guests from abroad in the educational process and to create friends for our system and our country.

IV. In order that we may provide a common basis of understanding, introductory sections are developed describing the primary, middle (junior), and secondary systems in the most general terms. Obviously, the stress again is on science.

V. Types of tertiary institutions are summarized, including such distinctly American variables as the two-year colleges and their many variations; the liberal arts colleges, including private and parochial; state colleges, and the universities, both public and private. We point to differences in terminology which can cause confusion for someone coming into this educational plan (e.g. "honors courses," "major field and minor fields," "prerequisite," and "the private and public sectors.") We have included the nature of each

type of institution's financial support, research facilities likely to be available, and degree of curricular autonomy. We devote some attention to the rather difficult-to-understand academic control through regional and professional evaluating bodies (The ACS Committee on Professional Training, Regional Accrediting Associations, etc.).

Six subject matter areas that would be common to most U.S. institutions are identified at the undergraduate as well as the graduate levels.

a) The general or introductory level of chemistry

b) Analytical Chemistry and Instrumentation

c) Organic Chemistry

d) Physical Chemistry

e) Inorganic Chemistry

(Obviously, general or introductory chemistry does not have a counterpart for the graduate program.)

For each subject matter area, a coordinator and two referees were chosen. These were persons not only with concern for undergraduate education, but also with experience in graduate instruction and research. Each had extensive international experience.

a) The coordinator in each area constructed a narrative which included the prerequisite chemistry needed to appreciate the particular level of subject matter as well as prerequisite demands in other subject areas, such as mathematics, physics, biology, etc. If several levels of difficulty are likely to be found they are described. In each subject area the role that the laboratory plays, as well as the time requirements, are covered.

b) A brief bibliography describes the most widely used texts in the field. (Our coordinators and referees have authored texts. No modesty was expected when the bibliographies were constructed.)

c) Perhaps of greatest utility, the coordinator, with help from the referees, constructs representative examination questions that cover the major segments of the specialty area. However, we have attempted to generalize, to show the importance of such segments of a course as mid-quarters, hour examinations, quizzes, laboratory input, special papers, and how they all contribute to an overall grade. The importance of independent work is also stressed.

In conclusion, may I state once again that we will have produced not a blueprint for education, but something that should be useful for the foreign student in fulfilling his or her major goals. It should also reduce the frustrations and repetitiousness that is often a part of a student's experience in this country.

CHAPTER IV: CONCLUSIONS AND RECOMMENDATIONS

Hundreds of educators, U.S. and foreign government officials, and men and women concerned with international exchange took part in the Conference discussions of how well U.S. curricula in key fields are meeting developing-country needs and what improvements could be made. Thus these conclusions and recommendations have been drawn from a variety of sources. Inevitably, they do not represent unanimous views. Specific recommendations are discussed in greater detail in the individual sections of this report.

These conclusions and recommendations are drawn from the following sources:

I. Pre-Conference Surveys of (a) U.S. Cultural and Public Affairs Officers in developing countries, (b) those countries' diplomatic representatives in the United States, (c) U.S. university departments in selected development fields, and (d) developing-country alumni of four U.S. universities who are now living and working in developing countries.

II. The Plenary Session.

III. The Seven Panel Discussions.

In addition, two speakers expressed dissenting opinions about the organization and emphasis of the Conference. Their summaries of their positions are included at the end of this Chapter.

I. PRE-CONFERENCE SURVEYS

A. Survey of U.S. Cultural and Public Affairs Officers

CONCLUSIONS

1. The fields of study most important to developing countries are (in order of the frequency with which they were cited): agriculture, engineering, business administration, health care professions, economics, science, education, engineering-related technologies, and public administration.

2. Even though U.S. education is designed primarily to meet the needs of the highly industrialized society of the United States, LDC graduates of U.S. colleges and universities have, in general, been very

successful in making the "translation" in terms of their own countries' needs.

3. Over all, a leading strength of U.S. education in scientific and technical fields is its ability to impart a systematic and pragmatic attitude toward problem-solving.

4. A weakness of U.S. higher education is that it often results in the graduate's returning home insufficiently familiar with the conditions and needs in his or her home country. Much of U.S. higher education, particularly in scientific and technical fields, reflects little interest in, or awareness of, problems and conditions in other countries.

5. Developing countries find education costs in the United States extremely high, often prohibitive.

RECOMMENDATIONS

1. Opportunities for training in technical skills below the university level should be expanded.

2. LDC students should have more opportunities for practical on-the-job training in addition to their academic work.

3. More emphasis should be placed on English-language training.

4. The United States should provide more scholarships for LDC students.

5. LDC students in technical fields should be trained in the techniques of teaching in addition to their specialties, so they will be better able to impart their skills to others when they return home.

6. Ways should be developed to increase the capacity of U.S. higher education to be aware of, and respond to, specific developing-country needs. Among the possibilities are linkages between U.S. and LDC universities and/or ministries of education and planning, and arrangements by which LDC students may do degree-related research in their home countries or on specific home-country problems.

B. Survey of Developing-Country Embassies in the United States

CONCLUSIONS

1. The fields of study most important for development (in order of the frequency with which they are cited) are: Engineering and engineering technology, health care professions, agriculture, business and management, teacher education, and science.

2. A leading strength of U.S. higher education is that it imparts self-confidence as well as analytical and problem-solving ability.

3. A major weakness is lack of awareness on the part of U.S. educators of needs, conditions, and cultural patterns in developing countries. As a result, graduates frequently return with insufficient awareness of how their U.S. education relates to their home countries.

4. For the most part, graduates of U.S. institutions are well regarded by home- country employers, have made contributions to national development, and have had successful careers in both the public and private sectors.

RECOMMENDATIONS

1. Developing-country students should be given greater financial support.

2. U.S. educators, especially in scientific and technological fields, need greater awareness of the conditions, problems and needs in developing countries.

3. Developing-country students need more opportunities for practical on-the-job experience in the United States before they return home.

C. Surveys of U.S. University Departments in Selected Development Fields

Economics

(Questionnaires were sent to the chairmen of the Economics Departments of 74 colleges and universities. For survey details, see Appendix B.)

RECOMMENDATION

To increase their capacity to understand LDC conditions, problems, and cultural context, U.S. faculty should have the opportunity to gain experience in LDCs as teachers, advisers, and researchers.

Engineering and Engineering-Related Technologies

(Questionnaires were sent to 84 schools of engineering. Details of the survey can be found in Appendix B.)

CONCLUSIONS

1. Modifying curricula for LDC students can be construed as creating "second-class" education for the developing world.

2. While it is not advisable to modify basic curricula, institutions can and often do adapt them to the needs of international students on a case-by-case basis.

RECOMMENDATIONS

1. U.S. universities should help developing countries set up their own technical schools in their own countries.

2. Arrangements should be made to provide LDC students with access to industrial experience.

3. U.S. engineering school faculty members should have the opportunity to observe and study conditions in LDCs which have substantial student populations in the United States.

4. International students should be given the opportunity to select thesis research topics that are relevant to the development needs of their countries.

Business Administration

(Questionnaires were sent to 49 schools. Details of the survey can be found in Appendix B.)

CONCLUSION

The managerial skills and analytical ability which business-school curricula are designed to impart are intended to help managers deal effectively with a variety of problems and thus are eminently transferrable to developing-country situations.

RECOMMENDATIONS

1. Any special curriculum for students from developing countries should give special attention to (1) resources, natural and human, (2) the field of international relations with international business as a subfield, (3) trade problems, commodity stabilization, preferential tariffs, etc.

2. Rather than expecting all business schools to offer curricula

designed for developing-country needs, selected schools could serve as centers for this type of instruction.

Health Care Professions

(Questionnaires were sent to 117 graduate schools of nursing, 132 schools offering programs in the allied health fields, and six schools of public health. Details of the surveys can be found in Appendix B.)

RECOMMENDATIONS

1. Schools of allied health professions should establish dialogue with representatives of developing countries and develop exchange programs to meet LDC needs.

2. Sending faculty and staff to establish and conduct allied-health-education programs in the LDCs might be more productive than having LDC students come to the United States.

3. Modifying curricula especially for LDC students opens up the possibility of an undesirable "double standard." However, LDC students could be given more time to complete the curriculum, along with special counseling.

4. In training of LDC people in allied health professions, efforts should be directed toward developing multi-competent generalists, able to work with or without supervision. U.S. allied health educators should spend time with the village and rural populations where the health problems are prevalent. Distinctions need to be made between rural and urban needs.

5. For U.S. nursing educators to serve LDCs most effectively, there should be institution-to-institution program development. U.S. personnel should go to the LDCs to teach, integrate, and stay long enough to have experience in problems the LDC is confronting. U.S. nursing schools need to know more about the conditions in the countries from which LDC students come.

Community and Junior Colleges

(Questionnaires were sent to 404 community and junior colleges. Survey details can be found in Appendix B.)

RECOMMENDATIONS

1. Faculty and staff of community, junior and technical colleges

should have the benefit of programs and other mechanisms to create greater awareness of international concerns.

2. More emphasis needs to be placed on English-language training.

Department of Biology

(Questionnaires were sent to Biology Departments of 67 colleges and universities, including some two-year colleges. Survey details can be found in Appendix B.)

CONCLUSION

Both LDC students and U.S. faculty must realize that although the basic scientific truths and information are transferrable, specific technologies may not be. The latter are a function of both the technology and the culture of the developing country.

RECOMMENDATIONS

1. Special centers and tutorial-type programs, perhaps concentrated at a few selected institutions, could help LDC students adapt to home-country needs the kind of broad, basic programs U.S. colleges and universities offer. Creating a special curriculum for LDC students presents the danger of creating a kind of second-class degree.

2. Many LDC students need help in gaining greater English proficiency.

Departments of Chemistry

(Questionnaires were sent to the chairmen of the chemistry departments of 67 colleges and universities. Survey details can be found in Appendix B.)

RECOMMENDATION

Some LDC students do not have preparation in the sciences comparable to that of U.S. students and could benefit from a basic science curriculum upon which they could then build a specialization. LDC students often frequently need help in English communication skills.

Department of Physics

(Questionnaires were sent to the chairmen of the physics departments of 67 U.S. colleges and universities. Survey details can be found in Appendix B.)

CONCLUSIONS

The basic principles of physics are universal and do not lend themselves to adaptation for particular groups of students, though some LDC

students could benefit from special instruction in particular applications, e.g., mechanical and electronic engineering applications, as well as teaching skills.

RECOMMENDATION

(One institution, the University of San Francisco, is contemplating a national science major for foreign students planning to return to their countries and teach in the primary or secondary schools.)

D. Survey of LDC Alumni of Four U.S. Universities

CONCLUSIONS

1. The average over-all use of LDC alumni of U.S. institutions is extremely high. Twenty-one per cent of a sampling of graduates since 1950 who are now working in developing countries report almost full use of what they learned; 48% report much use, 26% some use, and only 5% little or no use.

2. Graduates of U.S. institutions are strongly involved in the development of their countries. Thirty-nine per cent of respondents report being significantly involved and 50% moderately involved. Only 11% believe they are little involved.

RECOMMENDATIONS

Among the survey findings are the following indicators which can serve as guides for program planners. The foreign students most likely to engage actively in the development of their home countries upon returning from a U.S. higher-education experience are those who:

1. Leave home with a job awaiting them upon their return.
2. Have a good command of English.
3. Receive on-campus academic counseling in the United States.
4. Major in education or agriculture.
5. Work in Africa after graduation.
6. Have neighbors and associates at home with a high regard for U.S. education.

II. THE PLENARY SESSIONS

A. Address of Dr. Davidson Nicol

RECOMMENDATIONS

1. Exchanges of faculty between the United States and Third-World countries will enrich all concerned, increasing the ability of U.S. professors to understand Third World students, education systems, and conditions.

2. Every Third World student should receive some advice and training as to how to communicate his or her skills.

3. Vacation-time work, travel, and internship experiences of Third World students in the United States can be even more important than academic study, and should be planned accordingly. Third World students should have the opportunity to become acquainted with many aspects of life in the United States: "the structure of society, the legislative processes, and the ethics and morality of the millions of Americans who do their duty unnoticed by the multitude, over many years."

b. Address of Dr. Harold Enarson

RECOMMENDATIONS

1. Undergraduates from developing countries -- especially those from wealthy families -- should not necessarily be able to expect to have the costs of their U.S. education subsidized.

2. Requiring foreign graduate students to pay the full costs of U.S. education would require the sending nation to weigh costs and benefits and identify students and fields in which it wishes to invest scarce resources for development.

3. Upgrading the skills of faculty of LDC colleges and universities does more for national development than letting large numbers of LDC students "drift into programs of their own choosing."

4. Supporters of international education should urge the U.S. Congress to set up the proposed "Institute for Technological Cooperation," which promises to accelerate the process by which research is put to the service of mankind.

5. U.S. colleges and universities should analyze the configuration of their foreign student populations to determine just what they are doing for foreign students and why.

6. Rather than attempting to devise special curricula relevant to LDC students' needs, U.S. colleges and universities should examine their regular curricula to determine their relevance for both U.S. students and foreign students.

III. THE SEVEN PANEL DISCUSSIONS

SUMMARY OF CONCLUSIONS

(The following summary of the panels' conclusions and recommendations was prepared by Richard B. Myer, Chairman, and delivered in abbreviated form at the Conference. The individual panels' conclusions and recommendations are given in greater detail in Chapter III.)

I will begin with the subject which paradoxically may be least popular with LDC students and ending with the one in the most popular category. Thus, we shall begin with agriculture.

Recommendations from this panel - as from all the other panels - do not urge a modification of course content, as such, to meet an alleged need of foreign students for greater relevance. Rather they call for a variety of peripheral strategies to equip students for more effective performance at home. Such devices as cross-discipline training were recommended because, as they phrased it, foreign agricultural development problems cannot be understood through a single lens. Another is collaboration between U.S. and LDC universities so that joint programs become possible, especially those which enable the students to do their thesis research at home. A third approach to enhance relevance suggests building linkages with alumni for collaborative research, visiting professorships, sharing of reports, and the like. All of this will be expensive, of course, and the panelists could not resist the closing injunction that these recommendations will require additional funding from whomever or whatever is willing to provide it.

The engineering technologists state quite briskly that while modifications are needed in curricular structure and the schedule of courses a foreign student takes, there is a universality in the substance of engineering technology programs that make the question less than acute. These panelists are gravely concerned, however, about the rising tide of foreign students interested in our technologies programs, unfiltered by adequate screening mechanisms. Thus, they want the appropriate professional societies to create advisory bodies to help schools understand the needs of LDC countries and to help direct students to schools that offer relevant curricula. Similarly, they ask IIE and NAFSA to pay more attention to the technology education

community and to help them arrange to cope with the influx of these still little understood foreign students.

Finally, they point out - with some inconsistency, perhaps, - that teacher training institutions in engineering technology should be encouraged to develop courses related to appropriate technology (adding) that these should be for both foreign students and Americans.

The economic and social scientists in the panel on Theory and Practice of Development are of a mind to revise curricula for both American and foreign students, perhaps because economists have been having some difficulty deciding what is fundamental about the basic processes of their discipline - in regard to this economy and those at a less advanced stage. In any event, they want to give more attention to income distribution, shifting the emphasis away somewhat from income growth. Graduate education in this area should give less attention to preparation for academic life and more work on preparation for government and other applied roles.

I think it is fair to say the health experts believe that certification requirements are so rigid in their field and the opportunities so limited for foreign students. that it is not realistic to consider special curricula for this group. It is recognized, however, that faculty need to know more about health conditions abroad and especially about cultural taboos and the like which affect medical practice in different cultures. Knowledge of these matters would enable our teachers to give special guidance to the foreign medical student.

The scientists like the health professions people are not of a mind to alter course content for LDC students, believing that this is not necessary. What is necessary, in their view, is help in making the difficult transition to U.S. classroom folkways and demands. They want selection to be improved to insure that the best students are getting here. They advocate travelling teams of professional interviewers to accomplish this. They want to see orientation books published for foreign students on specific scientific disciplines, and have one underway now on the study of chemistry. Finally, they would like to see courses developed that would teach science management and organization, a set of techniques many LDC students soon require as they rapidly mount the science hierarchy at home.

Business educators report that foreign students are generally getting what they need - if they are not then we will have to conduct some quite extensive research to determine the deficiencies. If such are uncovered, they will have to be attacked by concentrating the corrective or special programs in a few institutions to ensure economies of scale. There are simply too few foreign students per school now to permit deans to authorize alternative curricula. The business panelists are convinced that their regular programs are being well utilized, especially as they enhance the students' ability to solve problems which may be unique to their circumstances.

Finally, they state that if additional resources are available to promote business education for LDC students it should be spent in shoring up schools in the LDCs.

Now a quick glance at the most popular foreign student discipline - engineering. The engineering panel wrote in its report, "The education community recognizes the need to pay serious attention to the foreign student clientele while at the same time meeting domestic commitments. Engineering concepts are by nature universal and special programs for foreign students are not deemed appropriate and existing curricula flexibility be used to best advantage." Further they wrote, "For the education of foreign students in the U.S., more attention must be paid to offering practical training and practical experience. Graduate students, whenever possible, should conduct thesis research in their home country; also they should be exposed to extra curricula learning in the university administration, project management, and the like to provide the additional insight most will need when they return home."

A final summary of panel recommendations must record that alternative curricula for foreign students are not on the agenda for any of these disciplines with the possible exception of economics and engineering technology.

On the other hand, there is some uncertainty, as suggested by Harold Enarson, that we know enough about relevance for U.S. students, to say nothing of foreign students. It may well be that research on

the former will uncover needed changes for both groups.

It is also evident that we have little knowledge of what course content would be more relevant for foreign students than what is now offered. It looks rather like the place to start, after all, is with some probing research and efforts to educate our own faculty on what life and work in the LDCs requires of our foreign student alumni.

DISSENT

There were two formal expressions of dissent, taking issue with basic assumptions of the Conference. A group of humanists took strong exception to the omission of the humanities from the fields of study regarded as most important to national development. A number of African and African-American participants stated that the U.S. domestic problem of racism vitiates much of its credibility in proposing solutions to world problems and called attention to sparse minority participation in the Conference. Their formal statements follow.

DATE: March 16, 1979

TO: The IIE

ABOUT: Lack of a humanities perspective in the 1979 Conference

As humanists and as individuals interested in the humanities, we, the undersigned, wish to indicate our concern at the omission of any focus on the humanities at the 1979-Conference of the IIE et al., on "International Education: The Global Context, the U.S. Role." We consider that the humanities provide the basis for understanding the problems of international education and ought to compose the substructure of global studies as taught, or about to be taught, in the United States.

The art, literature, religion, music, languages, history, etc., of the major world cultures must be appreciated and understood by Americans as the United States enters an increasingly global age. Ours is not a narrow conviction, but stems rather from the view that our nation must understand that there are real differences between societies that stem from historical-cultural experiences. Moreover, in terms of international education, American programs and activities must be sensitive to socio-cultural conditions in countries to which they are addressed, so as to reduce if not eliminate possibilities of internal conflict, reaction, and/or revolution, as has happened in Viet-Nam, Ethiopia, and, most recently, Iran.

Therefore, we think it incumbent upon IIE et al., not only to incorporate the humanities perspective into its future deliberations, but also to provide a forum for a substantial discussion of the contribution that the humanities can make in fostering international education and global studies. Many of us would be eager to assist you in these undertakings, because we believe that the IIE plays a vital role in representing the American view of education to the world and to a large domestic clientele. In other words, we seek to support the IIE and to make its work more consistent with the intellectual demands of the new, global age.

(signed)

Manon Spitzer
American Universities Field Staff

Dorothy Bruchholz Goodman
Washington International School

Martha Renaud
Institute of International Education

Sara P. Boucher
Florida Junior College at Jacksonville

Harold G. Marcus
Michigan State University

William J. Brazill, Jr.
Wayne State University

Bonnie R. Crown
Council on International and
Public Affairs

Mimi Summerskill
INTERALP

James S. Dalton
Siena College

Robert Garfias
University of Washington

Judith M. Barnet
Judith Barnet Associates

Jack Armstrong
Bradford College

Arthur M. Schaefer
University of the South

James M. Oswald
Research for Better Schools, Inc.

RECOMMENDATIONS BY A NUMBER OF BLACK PARTICIPANTS

We the African and African American participants of the 1979 Conference on "International Education: The Global Context, U.S. Role," wish to focus your attention on some of our concerns.

Let it be understood that we share the concept of the conference and offer our support to the ideals of international education. We further recognize the timely emphasis upon interdependence and empathetic communication among peoples of various world cultures. However, we observed deceptive disparities of dissonance in the approach to the theme of the conference.

The major disparity is the problem of racism.

In view of the fact that approximately 3/4 of the population of the world is of color, the United States' credibility in the area of global education is bound to be suspect as long as the United States does not rectify its basic domestic problem of racism. Only with the resolution of such a fundamental problem can the concept of international education become feasible and genuinely acceptable to Third World nations.

1) With regard to the conference agenda, the areas chosen for case studies--namely Nigeria, Mexico and the Middle East--areas which are at present extremely important to the energy crisis, cause one to wonder if this problem has pre-empted the importance of global education.

2) The absence of specificity with regard to the importance of the study of the languages and cultures of the peoples of the Third World, in our view, resulted in limiting the scope of the conference theme.

3) With the sparse representation of U.S. minorities, the conference participants missed the benefit of additional perspectives.

It is our strong hope that these important points will be seriously considered in defining the United States' role in "International Education: The Global Perspective."

(signed)

Tilman C. Cothran, Chairperson
Western Michigan University
Kalamazoo, Michigan 49008

APPENDIX A: COUNTRIES INCLUDED IN THE SURVEYS

The following countries were included in the surveys of developing-country embassies in the United States and U.S. diplomatic representatives abroad. The criteria for selecting them were (1) they were identified as either Third World, Fourth World, or OPEC countries, according to several economic and social indicators, in the Overseas Development Council's Agenda for Action 1976, and (2) with a few exceptions they had 150 or more students in the United States as reported in Open Doors 1976/77, IIE's census of foreign students. The exceptions consist of several countries which had fewer than 150 students in the United States but which sent representatives to a May, 1978, IIE seminar on student services, expressing interest in increasing the number of their students in U.S. institutions.

COUNTRY	NUMBER OF STUDENTS IN U.S. IN 1976/77 (OPEN DOORS)
Afghanistan	430
Algeria	770
Argentina	640
Bahamas	640
Bahrain	190
Bangladesh	600
Barbados	190
Benin	8
Bolivia	580
Brazil	2,470
Burundi	5
Cameroon	470
Cape Verde	0
Chile	1,050
China (ROC)	12,100
Colombia	2,450
Costa Rica	490
Cyprus	210
Dominican Republic	540
Ecuador	710
Egypt	1,200
El Salvador	720
Ethiopia	1,700
Ghana	1,570
Guatemala	350
Guyana	810
Haiti	580
Honduras	790
India	9,410
Indonesia	1,090
Iran	23,310
Iraq	720
Jamaica	1,800
Jordan	1,480
Kenya	1,190
Korea	3,630
Kuwait	1,240
Lebanon	2,220
Liberia	620
Libya	1,610
Malaysia	2,870
Mexico	6,450
Morocco	160
Nepal	200
Nicaragua	860
Nigeria	11,870
Pakistan	2,810
Panama	1,010
Peru	1,930
Philippines	1,930

Qatar	200
Saudi Arabia	4,590
Sierra Leone	880
Singapore	410
Sri Lanka	340
Sudan	500
Syria	430
Tanzania	320
Thailand	6,070
Tunisia	37
Uganda	340
United Arab Emirates	180
Uruguay	160
Venezuela	5,750
Zaire	210
Zambia	210

APPENDIX B: PRE-CONFERENCE SURVEYS OF U.S. INSTITUTIONS

This appendix contains summaries of the pre-Conference surveys of U.S. institutions conducted by IIE and NASULGC.

In addition to the material included here, the IIE surveys asked a sixth question: "What, if anything, do you think your college should be doing to devise or modify curricula or to prepare its faculty to meet the special needs of developing-country students?" The answers were thoughtful, lengthy, and not very susceptible to quantification. They have been omitted from this appendix because of space limitations. They were shared with the panelists before the Conference and are summarized in Richard Myer's summary of the pre-Conference research in Chapter I.

January 8, 1979

ALLIED HEALTH PROFESSIONS

Summary of Survey

Questionnaires were sent to 132 schools. This total included

1) 124 institutions affiliated with the Council of Educational Institutions of the American Society of Allied Health Professions (ASAHP)

2) 8 technical and allied -health-professions schools, not ASAHP affiliates, at which respondents read about the survey in the ASAHP newsletter and requested questionnaires.

Responses were returned by 42 schools.

REPLIES

4. Does your school have any programs designed especially to meet the needs of students from developing countries?

Yes: 2 institutions. Of these, one reported two programs.

Qualified Yes: One institution reported a program, now in the process of development, which has no foreign students enrolled now but which the respondent believes will develop into a particularly valuable program for LDC students.

No: 39 institutions (One respondent made the point that the institution itself had special programs for foreign students but not in Allied Health. This was counted as a NO answer for the purposes of this report.)

5A. In which individual Allied Health professions do you think your programs are particularly relevant to the needs of developing-country students?

No Answer: 1
All our professions: 4
Administrative & Health Services: 9
Allied Health Science Education: 3
Alcoholism: 1
Rehabilitation of the blind: 1
Clinical Laboratory services: 1
Cytotechnology: 4
Cardio-respiratory Science: 3
Child Development & Child Care: 1

Community Mental Health: 1
Cardio-pulmonary: 1
Communicative Disorders: 2
Development of multi-competent generalists: 1
Dental Hygiene: 6
Dietetic Technician: 1
Emergency Medical Services: 2
Environmental Health: 5
Gerontology Services: 1
Health Data Processing Technician: 1
Medical Assistant: 2
Medical Laboratory Technician: 4
Medical Record Technician: 6 (implement in 1979)
Medical Technology: 20
Multiple Competency Clinical Technician: 1
Nursing Education: 7
Nurse Anesthesia: 2
Nurse-Midwife: 1
Nursing Practical: 2
Nutrition & Clinical Dietetics: 9
Occupational Therapy: 6
Physical Therapy: 20
Pharmacy: 1
Pesticide Technology: 1
Physician's Assistant: 9
Radiologic Technology: 12
Respiratory Therapy: 9
Respiratory Therapy Technician: 2
Rehabilitation Counseling: 3
Speech Pathology: 2

5.B. Do you offer allied health programs which in your opinion are probably not relevant to the needs of developing-country students?

No Answer: 4
Yes: 4
No: 20

Biomedical communications: 1
Biostatistics: 1
Cytotechnology: 1
Clinical Psychology: 1
Dental Auxiliaries: 1
Extra Corporal Circulation Technician: 1
Health Science: 1
Medical Technology: 1
Nuclear Medicine: 2
Nursing: 1
Occupational Therapy: 3
Orthopedics: 1
Physical Therapy: 1
Radiological Physics: 1
Recreation Therapy: 1
Social & Rehabilitation Counseling: 3
Speech, Language & Auditory Pathology: 2

5.C. Have any evaluations been done of the relevance of your regular curricula to the needs of developing-country students?

No: 41
Yes: 1

"The University has been in correspondence with Nigeria to establish a program to educate Nigerian students in Radiologic Technology. Also they have been working with Bahamas regarding graduate students in Radiologic Technology."
--University of Nevada, College of Allied Health Professions

January 25, 1979

BIOLOGY

Summary of Survey

Questionnaires were sent to Biology Departments of 67 colleges and universities (including some two-year colleges). These were schools that had 500 Or more foreign students for the academic year 1977/78 (Open Doors figures).

Responses were sent by 24 schools.

4. Does your school have any programs designed especially to meet the needs of students from developing countries?

Yes: 1
Qualified yes: 1 (Described its fundamental, abstract research program as especially relevant.)
No: 22 (Two respondents described institution-wide English-as-a-Second Language programs, which were counted as NO answers for purposes of this study.)

5.A. What courses or specializations within the discipline do you think are particularly relevant to the needs of developing-country students?

No answer: 3
Our regular courses: 3
Aquatic bio: 1
Agriculture: 3
Applied fields of biology: 2
Basic biology: 3
Biochemistry: 1
Biosocial aspects of birth control: 1
Botany: 1
Cell biology: 2
Ecology: 4
Endocrinology: 1
Entomology: 2
Environmental bio: 5
Genetics: 3
Health care: 5
Human biology: 1
Human nutrition: 1
Marine biology: 2
Medical assisting: 1
Microbiology: 2
Oxicology: 1
Parasitology: 1
Pest management: 2
Physiology: 1

Population biology: 4
Pre-dental: 1
Pre-medical: 2
Radiological technology: 1
Respiratory therapy: 1
Scientific method and data analysis: 1
Theoretical background: 1
World food economy: 1
Zoology: 1

5.B. What courses or specializations are probably not relevant to the needs of developing-country students?

No Answer: 9
None: 5
All relevant: 2
Basic biology: 1
Biochemistry: 1
Cancer research: 1
Ecology: 1
Field botany: 1
Immunology: 1
Molecular biology: 3
Neurophysiology: 1
Systems physiology: 1
Taxonomy: 1

5.C. Have any evaluations ever been done of the relevance of your curricula to the needs of developing-country students?

No: 22
Yes: 2

"At the present time we have a student developing a teaching program in her home country of Rhodesia in ecology...this will be used to train the native population...at a young age in practical and applied ecology as it relates to their environment. We hope that this unit will demonstrate that the basic principles of ecology as present in our courses will show relevance when applied in a practical way..."
--University of Arizona, Department of General Biology, Tuscon, Arizona

"At the 2nd UNESCO International Training Course pertaining to cell biology held at the Agronomic Institute, Campinas, S.P., Brazil, we discussed the possibility of having a course evaluation....At this time, it should be possible to assess the value of the course to the students in the development of teaching and research programs."
--Ohio State University, College of Biological Sciences, Columbus, Ohio

"We have carried out evaluations of the Graduate Programs in Zoology in Brazil and are developing exchange arrangements for the MS level."
--University of Southern California (Allan Hancock Foundation), Los Angeles, California

January 3, 1979

BUSINESS ADMINISTRATION

Summary of Survey

Questionnaires were sent to 49 schools.

These were schools that

1) had AACSB-recognized graduate schools

2) had 200 or more full-time day students

3) were affiliated with institutions reporting 500 or more foreign students for the academic year 1976-77 (Open Doors figures)

(We added the American Graduate School of International Management, though it does not meet all the criteria, becuase of its specifically international orientation.)

Responses were sent by 26 schools.

REPLIES

4. Does your school have any programs designed especially to meet the needs of students from developing countries?

Yes: 5

Qualified yes (result of a technicality): 1

No: 20

5.A. Within your regular curriculum, are there courses or degree programs specifically addressed to the concerns of developing countries?

No answer: 11
Development economics: 8
International marketing: 5
No, none: 5
Economic planning for developing countries: 4
International business/international management: 4
International accounting: 2
International commodities trade and regulation: 2
International development banks: 2
International finance: 2
Agribusiness in developing countries: 1
International business law: 1

International development assistance management: 1
International transactions (balance of payments & trade): 1
Manpower development and training in developing countries: 1
Business forecasting for foreign economies: 1
International negotiations: 1
Economic and business development in Latin America: 1

5.B. In which of the above fields may a student specialize in earning a degree?

None: 9
No Answer: 14
Economic Development: graduate degree: 1
Economic Development: undergraduate degree: 1
International Business: BBA: 1, level unspecified: 1
International Relations: 1 (level unspecified)
International Business and Comparative Management - graduate level: 1

5.C. Apart from specifically development-oriented fields, which of your regular curricular offerings do you think are most relevant to the needs of developing-country students.

No answer: 12
Our regular bachelor's and master's level degree programs: 5
Courses mentioned once each were:

Economic development
World marketing (including special attention to LDCs)
International accounting and finance
Organization development
International economics and marketing
Regional economics -- courses within international economics

5.D. Are there any of your regular curricular offerings that you think would <u>not</u> be particularly relevant to the needs of LDC students?

No answer: 13
None: 6
Public-sector courses tied to U.S. institutional management: 5
Management information systems -- too dependent on sophisticated hardware: 1
Most courses take no cognizance of LDC requirements: 1

5.E. Have you ever done any evaluations of the relevance of your programs to LDC student needs?:

No: 16
No answer: 10

January 26, 1979

CHEMISTRY

Summary of Survey

Questionnaires were sent to the Chairmen of the Chemistry Departments of 67 colleges and universities. These were schools that had 500 or more foreign students for the academic year 1977/78. (Open Doors figures)

Responses were sent by 27 schools.

4. Does your school have any programs designed especially to meet the needs of students from developing countries?

Yes: None
No: 27 (Two institutions described English-as-a-Second Language programs. These were counted as NO answers for the purpose of this report.)

5.A. What courses or specializations within the discipline do you think are particularly relevant to the needs of developing-country students?

No answer: 2
All our regular courses: 7

Agriculture and natural sciences: 3
Analytical chemistry: 9
Biochemistry: 7
Chemical engineering: 5
Chemical management: 1
Environmental chemistry: 2
Food and agriculture chemistry: 3
Health professions: 1
Inorganic chemistry: 5
Modern science education: 1
Nuclear chemistry: 1
Organic chemistry: 9
Pesticides: 1
Physical chemistry: 3
Technology: 1

5.B. What courses or specializations are probably not relevant to the needs of developing-country students?

No answer: 7
None: 6
All are relevant: 2

Basic research: 3
Chemical physics: 1

Magnetic resonance: 1
Mass spectrometry: 1
Molecular beam research: 1
Physical chemistry: 1
Quantum chemistry: 2
Theoretical chemistry: 8

5.C. Have any evaluations ever been done of the relevance of your curricula to the needs of developing-country students?

No answer: 2
No: 23
Yes: --

"We have (in the past decade) had graduate students from Taiwan, Korea, India, Burma, Zambia, Tanzania, Zimbabwe (Rhodesia), Lebanon, Philippines. Most were eager to get immigrant visas. A career in chemical research can be pursued only with difficulty in an LDC."
--Boston University, Department of Chemistry, Boston, Massachusetts

January 19, 1979

COMMUNITY AND JUNIOR COLLEGES

Summary of Survey

Questionnaires were sent to 404 institutions. These were institutions which expressed interest in foreign students in response to an earlier survey of all accredited U.S. community and junior colleges conducted by IIE in cooperation with AACJC (the American Association of Community and Junior Colleges) and Rochester Institute of Technology. This survey formed the basis of the 1978 IIE publication, The Community, Technical, and Junior College in the United States.

Responses were provided by 128 institutions.

REPLIES

4. Does your school have any programs designed especially to meet the needs of students from developing countries?

Yes: 24 institutions reported a total of 27 programs

Qualified yes: 1 (institution replied yes but gave no further information)

The 27 programs described can be classified as follows:

English -language and orientation programs: 20
Vocational/technical programs combined with ESL: 2
Orientation for international students: 2
Vocational/technical programs designed especially for Nigerian students: 2
Regular vocational/technical program regarded as especially suitable for LDC students: 1

No: 103 institutions. Many explained that the basic reason was that they were two-year community colleges chartered and supported to meet local community needs.

5.A. In which of these key fields do you think your programs are particularly relevant to the needs of developing country students? Why? In what specific course offerings, at what levels, are they especially pertinent?

No answer: 11
None: 5
Not certain: 2
All fields mentioned: 10

Accounting: 8
Air Conditioning: 3
Agri-business: 3
Agronomy: 1
Allied Health Fields: 51
Architectural technology: 3
Automotive mechanics: 16
Aviation: 5
Bio-medical technolgoy: 1
Building construction: 11
Business and Management: 64
Civil technician: 1
Commercial beefkeeping: 1
Construction technician: 1
Crop production: 4
Dairy cattle production: 2
Data processing: 11
Dental hygiene: 4
Diesel and gas technology: 7
Dietition technician: 2
Early childhood education: 6
Electronics: 13
Electronic computer science: 2
Electrical engineering: 2
Engineering technology: 33
Environmental control program: 3
Fire science technology: 5
Fashion design: 1
Fisheries services: 1
Forestry technology: 1
Food manufacturing: 3
Geological technology: 1
Hotel-motel management: 6
Horologery-Jewelry-Gemology: 1
Industrial engineering technology: 4
Language arts program: 12
Land Rehabilitation (mining): 1
Licensed practical nurse: 9
Machinist: 4
Marine propulsion: 1
Marketing: 6
Mechanical drafting and design technology: 13
Manufacturing production: 3
Medical lab technician: 7
Mass communication: 1
Nuclear medicine: 1
Nuclear power: 1
Nursing: 15
Opthalmic science: 2
Petroleum technology: 1
Pharmacy: 3
Photography: 1
Powerplant: 1
Pre-engineering: 6

Pre-dentist: 4
Pre-forestry: 2
Pre-law: 3
Pre-medicine: 4
Printing: 1
Pre-textile management: 1
Radiological technology: 3
Respiratory therapy: 3
Radio technology: 1
Secretarial science: 6
Technical secretarial: 5
Teacher training: 1
Urban horticulture: 1
Vocational-technical fields: 9
Water waste technology: 4
Welding: 12
X-ray technician: 3

5.B. In which of the above fields do you think your programs are probably not relevant to the needs of developing country students?

No answer: 30
None: 33
Not applicable: 80

All our programs relevant: 9
Allied health fields: 8
Agricultural sciences: 23
Advanced first aid: 1
Business studies: 3
Commercial production methods: 1
Computer science: 2
Cosmetology: 1
Engineering technology: 10
Emergency medical technician: 1
Landscape design: 1
Liberal arts: 2
Marketing: 7
Park technician: 1
Technical-vocational: 6

5.C. Have any evaluations ever been done of the relevance of your regular curricula to the needs of developing country students?

No answer: 9
Not applicable: 1
No: 111
Yes: 4 (no formal evaluation (copy) has been sent.
1 - being developed)

January 10, 1979

ECONOMICS

Summary of Survey

Questionnaires were sent to the Economics Chairmen of 74 colleges and universities. These were schools or departments that were affiliated with U.S. colleges which reported 500 or more students in 1977-78, according to Open Doors surveys, and which offer four-year bachelor's or higher degrees.

Responses were sent by 30 institutions.

REPLIES

4. Does your school have any programs designed especially to meet the needs of students from developing countries?

   Yes: 8 institutions reporting 13 programs

   Qualified yes: 1 institution reporting two programs, but not in economics. (Because of ambiguity in the question, the respondent reported two university-wide programs: English as a second language and a foreign-student orientation program.)

   No: 21 institutions

5.A. Within your regular curriculum, are there courses or degree programs specifically addressed to the concerns of developing countries?

   No answer: 1
   Agricultural economics: 13
   Comparative economic systems: 2
   Communications: 1
   Demography: 2
   Development and Environmental Policy: 1
   Development Sociology: 1
   Economic development in Asia: 1
   Economic development in Latin America: 1
   Economic history: 1
   Economic planning for LDCs: 24
   Economy of public enterprise: 1
   Human capital in economic development: 1
   International development banking: 7
   International commodities trade and regulations: 21

International corporate finance: 1
Investment: 1
Labor economics: 2
Multinational corporations: 1
Nutrition and consumption: 2
Public finance in LDCs: 2
Regional development: 2
Special area courses in Africa: 1
Special area courses in Latin America: 2
Theory of economic development: 27
Trade, aid and development: 1
Urban and regional planning: 2
Urban and regional economics: 1

5.B. In which of the above fields, if any, may a student specialize in earning a degree? (The following are graduate programs unless otherwise indicated.)

No answer: 2
None: 2
All our graduate courses: 3

Agricultural economics: 13 (9 undergraduate)
Communications: 1
Development Sociology: 1
Economic development: 17 (4 undergraduate)
Economics: 5 (2 undergraduate)
Econometrics: 1
Economic planning for LDCs: 7 (1 undergraduate)
Environment: 1
International economics: 1
International commodities trade and regulation: 8 (1 undergraduate)
International development banking: 1
International finance: 2
Investment: 1
Labor economics: 1
Multinationals: 1
Nutrition: 1
Natural resources: 1
Public finance: 1 (1 undergraduate)
Regional economy: 1 (1 undergraduate)
Taxation: 1
Theory of economic development: 7 (2 undergraduate)
Urban/regional planning: 1

5.C. Apart from these specifically development-related fields, which of your regular curricular offerings do you think are most relevant to the needs of developing- country students?

No answer: 6
Agricultural marketing: 1
Accounting: 1
Basic theory: 6
Comparative economic systems: 3

Capital money market problems: 2
Computers: 1
Development finance: 1
Econometrics: 1
Economic growth: 1
Empirical methods: 1
Financial management: 1
B.A. degree in Economics: 1
International trade and finance: 8
International corporate finance: 1
Labor relations: 1
Monetary theory: 4
Micro and Macro: 3
Our regular graduate program: 6
Population dynamics: 2
Quantitative analysis: 3
Quantitative economics: 2
Regional economics: 2
Research methods: 1
Resource economics: 2
Statistics: 2
Standard training: 1

5.D. Are there any of your regular curricular offerings that you think would not be particularly relevant to the needs of LDC students?

No answer: 8
No: 9
All relevant: 1
Applied field with concentration toward U.S. institutions: 10
Economic theory: 1
Econometrics: 1
Urban problems: 1
Courses relevant to MDCs: 1
Mathematical economics: 1

5.E. Have any evaluations ever been done of the relevance of your regular curricula to the needs of developing-country students?

No answer: 3
No: 20
Yes: 4 plus 2 informal evaluations (none are included)
Not sure: 1

January 25, 1979

ENGINEERING AND ENGINEERING TECHNOLOGY

Summary of Survey

Questionnaires were sent to 84 schools.

These were schools that were affiliated with institutions reporting 500 or more foreign students for the academic year 1977/78 (Open Doors figures).

Responses were sent by 32 schools.

4. Does your school have any programs designed especially to meet the needs of students from developing countries?

No answer: 2
Yes: 8 institutions reporting 10 programs
No: 22 (Two institutions reported institution-wide English-as-a-Second Language programs. These were counted as NO answers for purposes of this report.)

5.A. Within your regular curriculum, are there courses or degree programs in any of the following which contain some course content addressed to the special needs of developing countries?

No answer: 9
None: 4

Aerospace: 5
Aeronautics: 4
Airport facilities: 2
Agriculture: 3
Aquaculture: 1
Forestry: 1
Irrigation: 1
Chemical: 8
Industrial processes: 7
Petroleum: 5
Civil: 14
Construction: 9
Environment: 11
Geology: 4
Sanitation: 9
Surveying: 7
Transportation: 8
Urban development: 9
Electrical: 10
Computers: 8
Power: 8
Systems: 8
Energy: 8
Generation: 6
Nuclear: 6
Transmission: 6

Utilization: 7
Materials: 16
Ceramics: 3
Metallurgy: 5
Mining: 2
Mechanical: 9
Automotive: 4
Air conditioning: 8
Heating: 6
Industrial: 6
Manufacturing: 6
Safety: 2

Other:
Agricultural mechanization in LDC: 1
Alternative technology: 1
Circuit communication 1
Diesel engineering: 1
Electro-mechanical technology: 1
Engineering management: 1
Environmental engineering: 1
General program: 2
Geological technology: 1
Health systems engineering: 1
Hydraulic engineering: 1
Industrial operations: 2
Low cost housing for LDC: 1
Mechanical design: 2
Nuclear technology: 1
Pilot training: 1
Planning: 2
Production process: 1
Research: 1
Textile engineering: 1
Wind power (mini-course): 1

5.B. Can a student earn a degree or certificate in a specifically development-oriented specialization?

No answer: 10
No: 17
Yes: 5

Master's in International Development: 1
M.S. in Engineering: 2
All engineering fields: 1
Certificate in one special course: 1
Graduate programs tailored to individual needs: 1

5.C. Apart from specifically development-oriented fields, which of your regular curricular offerings do you think are most relevant to the needs of developing-country students?

No answer: 7
None: 1
All our fields relevant: 6
Agricultural engineering: 5
Biological engineering: 1
Chemical engineering: 2
Civil engineering: 15
Communications engineering: 1
Construction engineering technology: 3
Diesel technician: 1
Drafting and design: 2
Engineering environmental: 1
Engineering technology: 1
Engineering electrical: 6
Engineering management: 1
Engineering mechanical: 7
Engineering manufacturing: 3
Engineering nuclear: 2
Engineering mineral: 2
Engineering mining: 1
Energy: 1
Fuel management: 1
Manufacturing: 3
Metal production: 1
Metallurgy courses: 1
Mineral processing: 1
Research: 1
Transportation: 1

5.D. Are there any of your regular curricular offerings that you think would <u>not</u> be particularly relevant to the needs of LDC students?

No answer: 13
No: 10
Yes: 1 (Applied to highly technological problems in U.S.)

Aerospace engineering: 3
Anelastic relaxations in crystals: 1
Astronomy: 1
Chemical engineering: 1
Computer oriented coursework: 1
Electronics: 1
Labor relations: 1
Materials engineering: 1
Mathematics: 1
Nuclear engineering: 3
Physics: 1

5.E. Have any evaluations ever been done of the relevance of your regular curricula to the needs of developing-country students?

No answer: 6
No: 25
Yes: 1 (Not formal, but feedback from graduates who have returned to their countries, on the applicability of their studies at Ohio State.)

January 11, 1979

NURSING AND RELATED HEALTH-CARE FIELDS

Summary of Survey

Questionnaires were sent to 117 graduate schools of nursing. The list was provided by the National League for Nursing (NLN), the professional accrediting agency in the field. It included both NLN-accredited graduate schools and graduate schools not so accredited.

Replies were received from 69 schools.

REPLIES

4. Does your school have any programs designed especially to meet the needs of students from developing countries?

Yes: 1 institution reported 1 program

Qualified yes: 1 institution reported a primary-care program now under development which is not designed exclusively for LDC students but one which the respondent deems highly relevant and which the World Health Organization (WHO) is currently using for one grant for an LDC student.

No: 67 institutions. 2 institutions qualified this reply that the universities with which they were affiliated had special foreign-student services programs, not restricted to the field of nursing. 1 replied that it had had such a program in the past but had discontinued it. 1 replied that while it had no special programs for LDC students, it had a program in cross-cultural nursing to meet needs of culturally diverse groups.

5.A. Within your regular curriculum, are there courses or degree programs that are particularly adaptable to the needs of developing countries in any of the following fields?

No answer: 3
None: 2
Adult Health: 1
Clinical Specialist Nurse: 6
Critical Care Specialist: 2
Child Psychiatric: 1
Community Health Education: 12
Maternal-Child Health: 7
Nurse Practitioner: 32
in the planning stage: 1

Nurse-Midwife: 8
proposed: 1
Nursing Education: 41
Nursing Administration: 32
Public Health Nursing: 20
Psychosocial Nursing: 1
Transcultural Nursing: 2
Child Nursing: 2
Perinatal Nursing: 1
Aging Nursing: 1
Gerontological Nursing: 3
Medical-Surgical Nursing: 11
Family Nursing: 2
Pediatrics: 7
Preventive Health Care: 1
Primary-Care Nursing: 3
Psychiatric-Community Mental Health: 12

5.B. In which of the above fields, if any, may a student specialize in earning a master's or doctoral degree?

The following are all Master's Degree unless otherwise indicated.

No answer: 3
Administration and Management of Nursing: 26
Clinical Investigation: 1 Ph.D.
Clinical Practice :3
Clinical Specialist: 1
Community Health: 12
Critical Health: 1
Nurse Practitioner: 10
Nurse Practitioner - Adult: 5
Nurse Practitioner - Family: 4
Nurse Practitioner - Geriatric: 1
Nursing - Cardiovascular: 1
Nursing - Child Health Care: 5
Nursing - Child Psychiatric: 2
Nursing - Disabilities: 1
Nursing - Community-Family Health: 6, 1 Ph.D.
Nursing - Community Mental Health: 3
Nursing - Cross-Cultural: 1
Nursing - Diabetes emphasis: 1
Nursing - Education: 13, 3 Ph.D.
- Nursing Research: 1 Ph.D.
- Ph.D. Program underway: 1
Nursing - Gerontological: 8
Nursing - Ill Adult: 1
Nursing - Ill Child: 1
Nursing - Maternity: 2
Nursing - Midwife: 6
Nursing - Occupational: 1
Nursing - Parent/Child: 10, 1 Ph.D.
Nursing - Perinatal: 2
Nursing - Psychiatric Mental Health: 19, 1 Ph.D.
Nursing - Psychosocial: 1
Nursing - Teacher in Community Health: 3

Nursing - Well Adult: 1
Nursing - Well Child: 1
Primary Health Care: 1
Public Health: 2

Above degrees may be combined with teaching and preparation in administration: 2

5.C. Which of your regular curricular offerings do you think are most relevant to the needs of developing-country students?

All Master's education is directed toward leadership, research and consultation skills through the generalists' and specialists' pathway: 1

No answer: 6
Clinical Courses: 12
Community Health: 11
Entire Undergraduate Program: 1
Our regular Master's level degree program: 18
Varies with the needs of the student: 1
Education Focus: 9
Family Health: 1
Epidemiology in Community Health: 1
Health Care: 8
Gerontological Nursing: 3
Maternal-Child Health: 2
Nurse-Midwife: 5
Nursing Administration: 9
Nurse Practitioner: 9
Occupational Health Nursing: 2
Oncology: 1
Parent-Child: 2
Primary Care: 2
Physiology: 2
Psychosocial Nursing: 1
Programing: 1
Psychiatric - Community Mental Health Nursing: 1
Theory for Practice and Research: 8
Teachers in Nursing: 3

5.D. Are there any of your regular curricular offerings that you think would not be particularly relevant to the needs of most LDC students?

No answer: 16
None: 31
Uncertain: 5
Not qualified to Answer: 1

Clinical Nurse Specialist: 1
Cardiology Nurse Specialist: 1
Nephrology Nurse Specialist: 1
Family Therapy Nurse Specialist: 1
Highly Technical (Medical-Surgical): 2
Institutional Epidemiology: 1
Nursing Education: 1

Research, Theory: 2
Psychiatric-Mental Health Nursing: 2
Undergraduate program without discrete subject area courses: 1
Social Policy: 1

5.E. Have any evaluations ever been done of the relevance of your regular curricula to the needs of developing-country students?

No answer: 3
Yes: 1 (report not available)
No: 63
In the process of developing a format for such a study: 1

January 29, 1979

PHYSICS

Summary of Survey

Questionnaires were sent to 67 schools.

These were schools that had 500 or more foreign students for the academic year 1977/78 (Open Doors figures).

Responses were sent by 28 schools.

REPLIES

4. Does your school have any programs designed especially to meet the needs of students from developing countries?

   No: 25 (One institution reported a university-wide English-As-A-Second Language program, counted as a No answer for this study.
   Yes: 3 institutions reporting 6 programs.

5.A. What courses or specializations within the discipline do you think are particularly relevant to the needs of developing-country students?

   No answer: 1
   Our regular courses (programs in B.S., M.S., Ph.D.): 8

   Acoustics: 2
   Applied physics: 3
   Astronomy: 2
   Atomic-molecular physics: 4
   B.S. in physics: 5
   Business (special program related to science degree): 1
   Engineering: 5
   Experimental physics: 5
   Laser physics: 1
   Lab courses: 1
   M.A. in teaching: 1
   Mathematics: 2
   Nuclear physics: 4
   Optics: 1
   Plasma physics: 3
   Research specialization: 4
   Sciences: 3
   Solid-state electronics: 1
   Solid-state physics: 6

Superconductivity: 1
Theoretical courses: 3
Thermodynamics: 1

5.B. What courses or specializations are probably not relevant to the needs of developing-country students?

No answer: 7
None: 4
All courses relevant: 1

Astronomy: 1
Astrophysics: 2
Cosmology: 2
Elementary particles: 1
General relativity: 1
High energy physics: 6
High technology areas: 1
Interaction of magnetic fields and materials: 1
Low temperature physics: 2
Medium energy physics: 3
Nuclear physics: 3
Particle physics: 2
Plasma physics: 1
Properties of gases: 1
Quantum field theory: 1
Relativity: 2
Statistical mechanisms: 1
Surface physics: 1
Theoretical physics: 6

5.C. Have any evaluations ever been done of the relevance of your curricula to the needs of developing-country students?

No answer:
No: 24
Yes:

"Foreign graduates in this Department are almost exclusively from Taiwan and India. Both of these countries have the technological base to support physics Ph.D.'s, although in recent years positions in those countries have been in short supply."
--University of Pennsylvania, Department of Physics, Philadelphia, PA.

NATIONAL ASSOCIATION
OF STATE UNIVERSITIES
AND LAND-GRANT COLLEGES

INTERNATIONAL PROGRAMS
AND STUDIES OFFICE

Suite 710, One Dupont Circle, Washington, D. C. 20036 202 293-7120

November 8, 1978

Report on Survey of National Association of State Universities and Land-Grant Colleges (NASULGC) on Programs for Foreign Students

In preparation for the 1979 Conference on International Education which will be convened by the Institute of International Education, NASULGC sent a questionnaire to their institutions to determine if they have programs designed to meet the special needs of entering students from developing countries. The key fields surveyed at the undergraduate and graduate levels are: agriculture, engineering, business, health care, and teacher education. This report contains a chart which tabulates the responses to the questions and gives examples of specific programs for students from developing countries.

Of the 78 schools which responded to the questionnaire, 49 have indicated they offer intensive English Language Programs for foreign students. The courses meet the needs of students from developing countries even though they are not designed specifically for them. The purpose of these courses is to bring students up to the level of proficiency in English needed to be admitted to a degree program. An example of one of these intensive English program is conducted at the Institute of English as a Second Language at the University of California Extension at Riverside.

Although major emphasis there is placed on introduction in English as a foreign language, the curriculum includes an introduction to American life and culture. Specialized non-degree courses are offered in engineering, business administration and agriculture. Students with sufficient language skills are able to enroll in regular university courses on a limited basis.

Another example is the intensive program in English as a second language offered at the Center for American Language Studies, located at Merrill College of the University of California at Santa Cruz. The 12-week program includes classes in Spoken English, Reading&Vocabulary, Writing, Listening Comprehension, Pronunciation, American Studies, Language Laboratory, English Conversation, and a series of 6-week Elective Courses on such topics as TOEFL Preparation, Business English, Typing, etc. In addition to classroom instruction in English, students will have the opportunity to participate in a program of community, cultural, and touristic activities which can include such things as home stay visits with American families, (optional) trips to factories and schools, and attendance at cultural events.

Nineteen institutions surveyed have orientation programs for foreign students to introduce them to campus life. The University of Southern Illinois has a program to assist graduating international students in re-entering their own countries. Fifteen of the NASULGC surveyed have no courses because the foreign student population was too low to warrant them.

Those institutions with graduate schools with programs for foreign students assign research subjects to these students which they consider relevant to the situations in their countries. It was found that a very low percentage of foreign Ph.D. and masters' degree candidates conduct their thesis research in their home countries. At these institutions the future planning of curriculum for students from developing countries will be concerned with special subject matter areas and not with major policy changes in the undergraduate and graduate schools.

The following are specific examples of programs tailored to meet the needs of students from developing countries. The majority of the special programs are offered in the fields of teacher education and technical and vocational training with their main purpose being to provide the student with basic subject matter lacking in his/her previous education at home.

TEACHER EDUCATION AND TECHNICAL/VOCATIONAL TRAINING:

University of Illinois

1) International Programs in Science Education and Vocational and Technical Education. These programs are designed for those who work in the planning, administration, teacher training and instructional roles at the Ministry, University & Polytechnique levels.

2) International Education and Rural Development. This course examines current literature dealing with building of educational and technical institutions needed to further agricultural and rural development.

University of Wisconsin

Educational Policy Studies, History and Department of Curriculum and Instruction faculties jointly organize seminars for students from African and East Asian countries.

University of Pittsburgh

Nigerian Leader Development Project. This program is designed to provide courses and experiences aimed at developing academic skills which will enable students to enter regular classes.

University of Connecticut

Public Management and Development Program. This is a 3½ month training program for the Federal Ministry of Establishment in Nigeria. The PMDP and the School of Education

offer a combined program of study for Nepalese educators leading to the M.A. in Education.

BUSINESS:

University of Pittsburgh

Banking and Society in American. This course trains middle level bank managers from Japan in the origins and current practices of the American banking university.

ENGINEERING:

University of Massachusetts

Algerian program in Engineering. This program is specifically designed for Algerian undergraduates in mechanical engineering.

AGRICULTURE:

University of Missouri

Agricultural Economics, Agronomy, Food Science and Nutrition. These courses are tailored to the needs of students from developing countries.

Montana State University

Two to four-year program in Plant Pathology, specifically designed for students from developing countries.

LIST OF NASULGC INSTITUTIONS SURVEYED

University of North Dakota
Colorado State University
University of Tennessee, Martin
University of Tennessee, Knoxville
University of Tennessee, Chattanooga
University of Illinois at Urbana - Champain
Pennsylvania State University
University of Pittsburgh
Florida State University
Texas A&M University
Louisiana State University
University of Wisconsin - Madison
Kansas State University
University of Missouri - Kansas City
University of Vermont
West Virginia University
Southern Illinois University at Carbondale
Texas Tech. University
University of Kansas
North Carolina Agricultural and Technical State University
University of Texas - Austin
University of Connecticut
University of Missouri
University of Colorado at Boulder
Ohio State University
South Dakota State University
University of North Carolina Chapel Hill
University of South Carolina
University of Massachusetts,Amherst
University of Maine
Iowa State University
University of California - Riverside
University of Missouri - Rolla
Georgia Institute of Technology
University of Michigan
University of Wisconsin - Milwaukee
University of Maryland
Cornell University Center for International Education
University of Washington
University of Arkansas
University of California - Irvine
State University of New York at Albany
Miami University
Washington State University
Florida Agricultural and Mechanical University

University of California - Berkeley
Louisiana State University - Shreveport
Rutgers University
University of Virginia
College of Virgin Islands
Delaware State College
North Dakota State University
University of Delaware
University of Missouri
South Carolina State College
Texas Southern University
University of Arizona
Lincoln University
University of Georgia
Oklahoma State University
University of California - San Diego
University of Illinois- Chicago Circle
Washington State University
University of South Dakota
Arizona State University
Oregon State University
Virginia Polytechnic Institute
University of California - Santa Barbara
University of Nevada
North Carolina State University
University of Nebraska - Lincoln
University of Nebraska - Omaha
State University of New York - Binghamton
University of California - Los Angeles
Montana State University
University of California - San Francisco
University of California - Santa Cruz
University of Puerto Rico

EVALUATION OF SPECIAL PROGRAMS OFFERED

(Primarily English Language)

Is the main purpose of the program to:	yes	no
a) Provide the student with basic subject matter lacking in his/her previous education at home.	42	4
b) Introduce the student to the American system of education.	25	21
c) Evaluate the students' ability to pursue a particular field of study.	13	29

Summary of special provisions made in curriculum for students from developing countries in fields of: agriculture, business, teacher education , health and engineering

	AGRICULTURE				BUSINESS				TEACHER EDUCATION				HEALTH				ENGINEERING				GENERAL GRADUATE COURSES	
	undergrad.		grad.		undergrad.		grad.		undergrad.		grad.		undergrad.		grad.		undergrad.		grad.		undergrad.	grad.
	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no
a) Are special seminars or courses organized only for foreign students?	9	28	3	4	2	44	0	9	10	43	6	6	5	34	1	6	3	42	0	6	9	41
b) Special field trips?	13	24	4	3	2	45	0	7	13	40	8	4	3	36	1	5	2	43	0	6	10	40
c) Tutorial?	1		4	3			0	8			9		3		1	5			0	6	15	29
d) Is special practical training and/or field experience strongly suggested or required for foreign students only?	12	23	5	3	7	42	0	6	15	38	7	5	3	36	0	6	6	40	2	4	13	34
e) Are specific courses required for foreign students which are not required for U.S. students?	7	29	2	6	5	40	1	7	12	40	2	10	3	36	2	4	7	37	0	6	14	35
f) Do professors incorporate into courses, material deemed relevant to foreign students?	28	7	6	2	15	27	3	4	21	32	7	3	11	26	2	5	11	34	2	4	23	23

g) Are graduate students assigned research problems considered relevant to their home country situations?

7	as a policy
58	in so far as possible
11	rarely
1	only if sponsors provide financial support
2	more common at the masters level than Ph.D.
10	more common at the Ph.D. level than masters

h) Graduate student research in home country:

	0 - 5%	6 - 10%	11 - 20%	over 50%
a- Approximately what percentage of foreign masters candidates conduct their thesis research in their home countries.	50	7	3	3
b- Approximately what percentage of foreign Ph.D. candidate conduct their thesis research in their home countries.	34	7	9	6

For future curricular planning at your institution will relevance to the student clientele from developing countries be in general:

a) a major policy consideration	13
b) an important factor for certain subject matter area only	49
c) not considered	10